Building age.

New York, David Willaims company [etc.]

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INDEX

BUILDING AGE

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INDEX

BUILDING AGE

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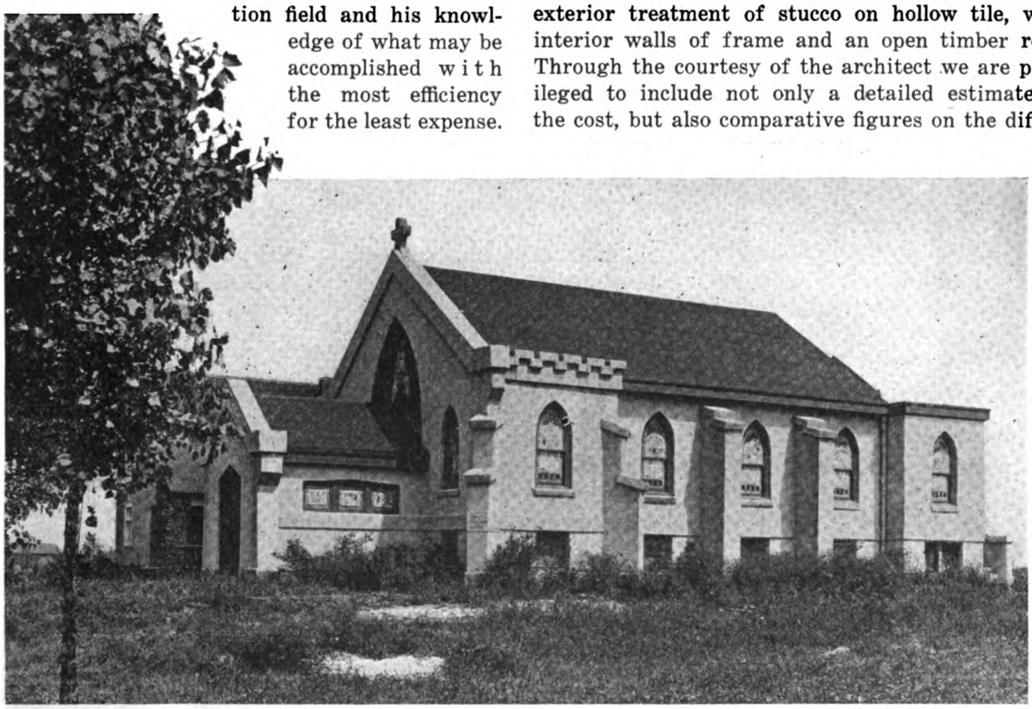
A Hollow Tile Church for the Suburbs

A Stucco-Coated Building with an Open Timber Roof—Figures of Cost

THE contractor and builder who is called upon to erect a variety of structures for rural communities is often confronted with the problem of doing this work where appropriations are quite limited, and which in many cases results in buildings that do not measure up to his ideas of what should be done. Where the contractor acts in an advisory capacity in the designing of such buildings, his counsel is valuable because of his experience in the construction field and his knowledge of what may be accomplished with the most efficiency for the least expense.

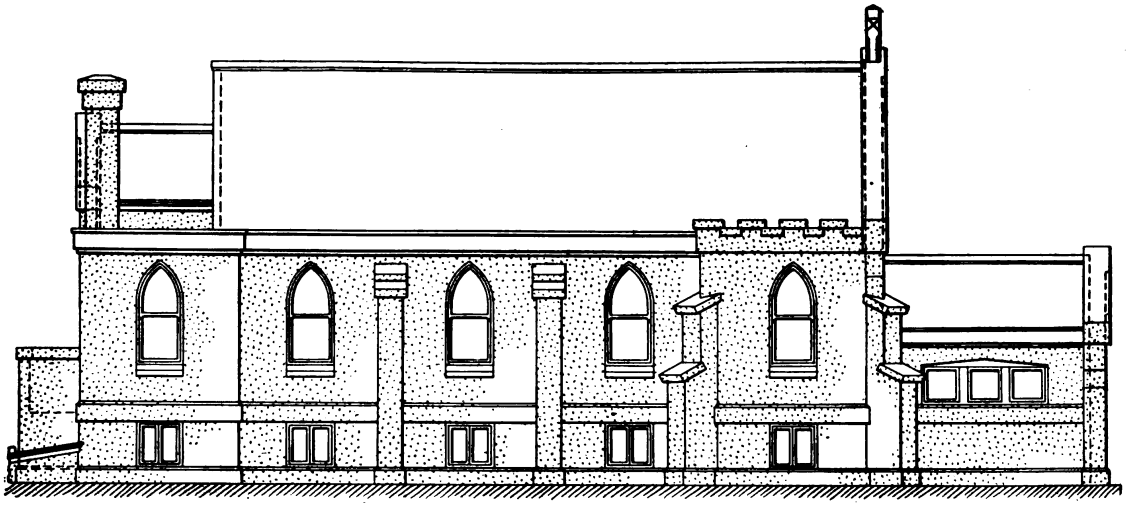


General View of the Church Building.—Architect, Arthur U. Gerber, Chicago, Ill.

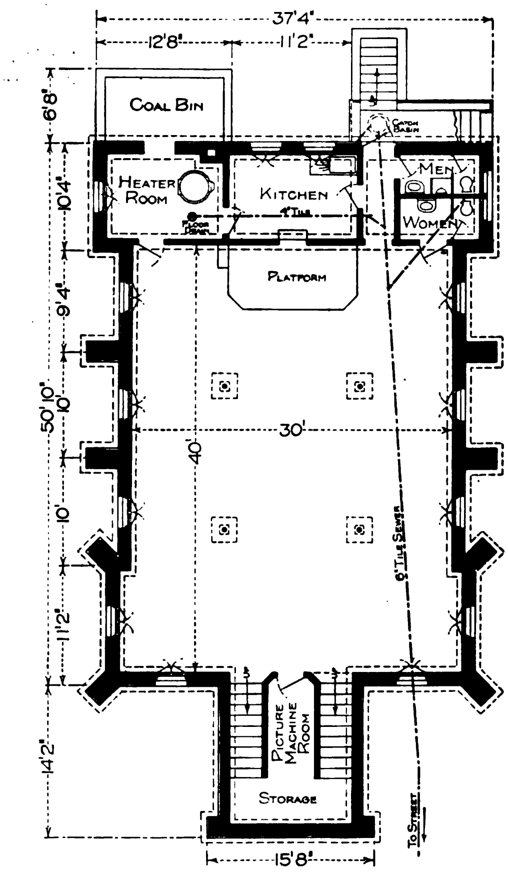
There has been a growing tendency in recent years to improve such buildings along architectural lines, for the architect and the builder have realized that many artistic touches can be introduced in the interior and exterior treatment without increasing the cost to any appreciable extent. Where such service is conscientiously and intelligently rendered the result is a building that will be the pride of the community and a tribute to the resourcefulness of the contractor. Evidence of this is to be found in all types of rural structures and there are exceptional opportunities for such progress in the designing of churches.

A subject of moderate priced construction has been selected especially for readers of the BUILDING AGE in the presentation of the Trinity Evangelical Lutheran Church at Ardmore, Ill., which has an exterior treatment of stucco on hollow tile, with interior walls of frame and an open timber roof. Through the courtesy of the architect we are privileged to include not only a detailed estimate of the cost, but also comparative figures on the different types of floor construction. These show the possibilities for a great saving with one row of columns over a clear span, and, as built, a still greater saving by using two rows of columns.

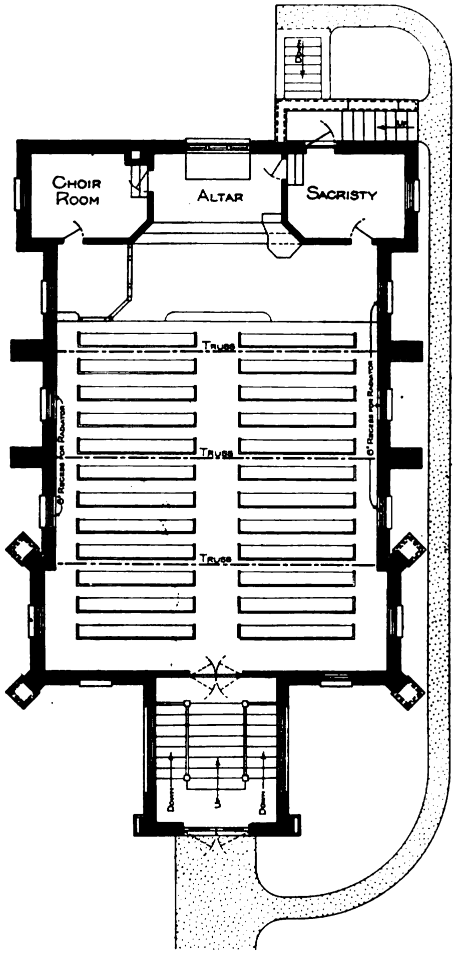
The church faces west and rests on concrete foundations to grade, having a length of 64 ft. 6 in. in the extreme, with a width of 34 ft. at the front



Left Side Elevation of the Church—Scale 3/32 In. to the Foot



Basement Plan Showing Kitchen, Heater Room and Toilets—Scale 1/16 In. to the Foot



Auditorium Plan—Scale 1/16 In. to the Foot

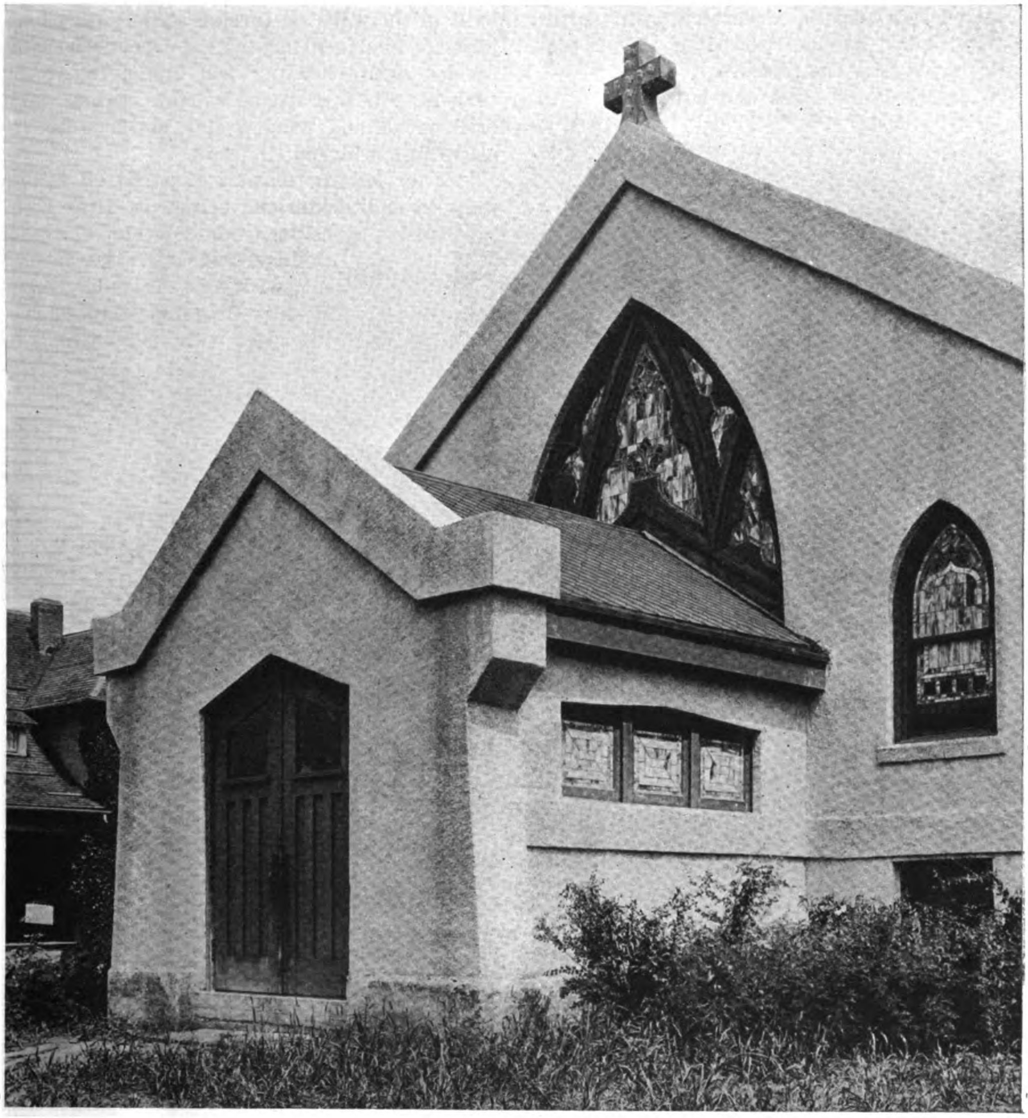
Side Elevation and Floor Plans of Hollow Tile Church for the Suburbs

and 37 ft. at the back, and a height to the apex of the roof of 26 ft. 8 in. The main entrance gives access to a hall which has a stairway 5 ft. 6 in. wide to the church, on either side of which are 3-ft. stairways to the Sunday school in the basement. One of the interesting features of the basement plan is a moving picture room under the main stairway, which will be used to accommodate moving picture apparatus on entertainment occasions. The Sunday school is lighted by windows on three sides. The floor plan provides two toilet rooms in one corner, a boiler room in the opposite corner, and between them a kitchen is provided back of a platform, with complete plumbing and cooking equipment.

The church measures on the first floor 48 ft. long by 32 ft. wide, and is designed to accommodate twenty-four pews, 11 ft. wide, in two sections. At the present time chairs are used, but the future arrangement of the pews will leave a 4-ft. center aisle and a distance of 2 ft. from either wall. The altar is flanked on either side by a 11 x 8-ft. choir room and sacristy, each of which has two doors, one from the church and another from the altar.

All footings for wall, columns, buttresses, foundation walls, water table, rear area walls and stairs to the basement and sachisty, concrete steps, door sills, chimney cap, cross, etc., are of concrete, composed of one part Portland cement, three parts sharp torpedo sand and five parts of crushed limestone. On the removal of timber "forms" all voids in exposed surfaces were neatly pointed with cement mortar and the whole given a brush coat of cement and water.

The entire basement and rear basement entry have a concrete floor 3 in. thick, composed of the

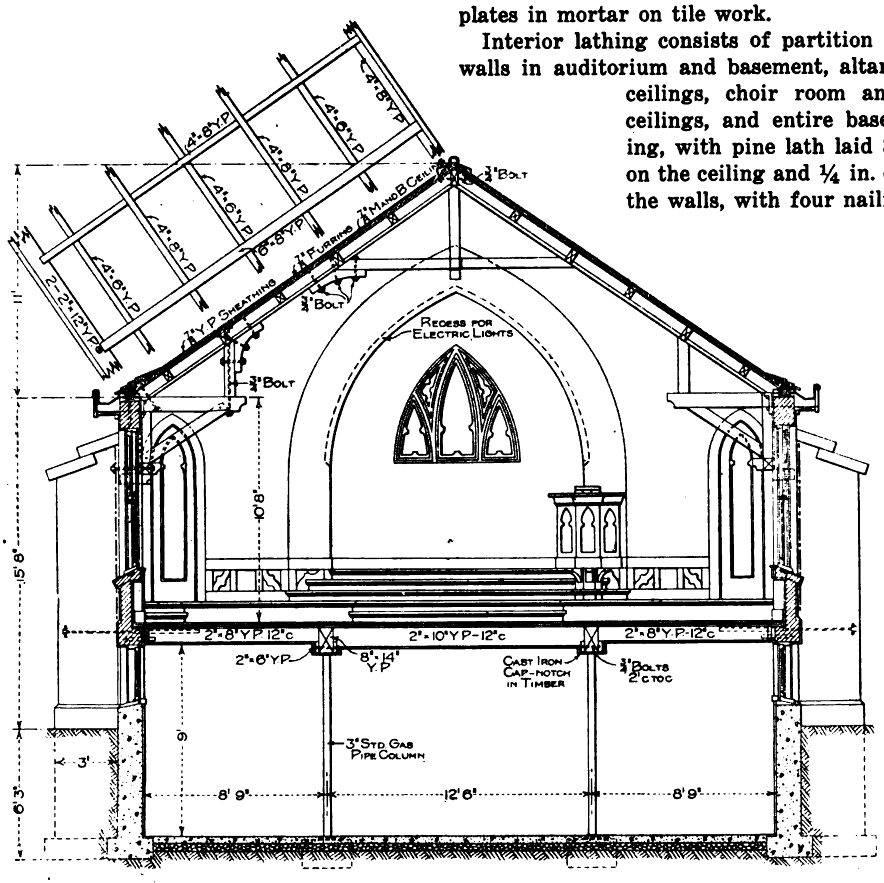


An Excellent Detail of the Main Entrance to the Church

same proportions as the other concrete. The floors rest on a 6-in. bed of clean cinders and have a ½ in. of top dressing of one part Portland cement and two parts torpedo sand. All concrete steps and stairs have the same final treatment as the floors.

All exterior walls, buttresses, chimney, and side walls of outside steps are built of "Natco" hollow tile, the blocks being laid with the cores vertically in the walls, with faces scored with a special dovetail to offer a good surface for the stucco finish. The mortar used for laying up the blocks consisted of one part Portland cement and three parts of sand, mixed to a smooth, moderately stiff mortar. Lime, well slaked and not exceeding 10 per cent, was also included in the mixture.

All walls are 12 in. thick and buttresses 18 in. thick, extending 3 ft. from the walls and corners. Where basement girders rest on the walls, the vertical cores of the tile are filled with Portland cement concrete from the under side of the beams to the concrete foundation. The three buttresses nearest the rear and on each side of the building are filled with this mixture and have steel rods. The lintels over the openings in outside walls are formed of tile with horizontal cores, filled with concrete and reinforced with steel bars of the strength required.



A Vertical Cross Section with Roof Framing Details—Scale ⅛ In. to the Foot

Terra cotta slabs 1 in. thick are set under all floor beams to serve as bearing plates and are the full width of the wall. The same slabs are also used for working up to levels and story heights when the full or half blocks did not work out. Embedded at intervals of 5 ft. in the walls under the roof plates are ¾-in. bolts 30 in. long, with nut and washers, projecting 6 in. above the top of the wall to allow the plate to be fastened down. The bolts were filled around with cement grout before the placing of the roof plates.

One-inch slabs were also placed on the tile course directly below the bolts. The cement contractor built in the walls all furring strips and blocks and joist anchors furnished by the carpenter-contractor besides firmly bedding and filling in around all timbers, pointing around window frames, inside of brick molds and window sills, and bedded at wall plates in mortar on tile work.

Interior lathing consists of partition and frame walls in auditorium and basement, altar arch and ceilings, choir room and sacristy ceilings, and entire basement ceiling, with pine lath laid 3 in. apart on the ceiling and ¼ in. or more on the walls, with four nailings to the lath, and joints broken every 18 in., all put on horizontally. All corners were made solid before lathing.

The inside walls of toilet rooms are lathed for cement wainscots from floor to the under side of the windows, with No. 24 gauge galvanized "Herringbone" expanded metal lath. All recessess in the tile walls were plastered, as were all wood lintels and beams and wherever woodwork joined tile walls with lath in the best manner. All lath lapped 6 in. on tile and frame walls.

Inside plastering on walls, partitions and ceiling throughout except auditorium ceiling, entrance hall ceiling and concrete foundation walls, is two-coat work, except in the auditorium, altar and entrance hall, which have three coats.

In the case of two-coat work, the first coat is lump lime and sharp sand, well mixed with 1½ bushels of best long cattle hair to each cask of lime. The second or skim coat is lime putty and washed sand, troweled to a hard, smooth surface.

In the case of the three-coat work, first or scratch coat was the same as that specified for two-coat work. The second or brown coat the same except that ½ bushel of hair was proportioned to 1 cask of lime. The third coat was composed of lime putty and washed sand, floated with wooden or cork-faced float to even surface equal to rough sand paper.

The contractor used two coats of "Adamant" for two-coat work and for first and second coats of three-coat work. Galvanized metal corner strips were provided on all exposed corners.

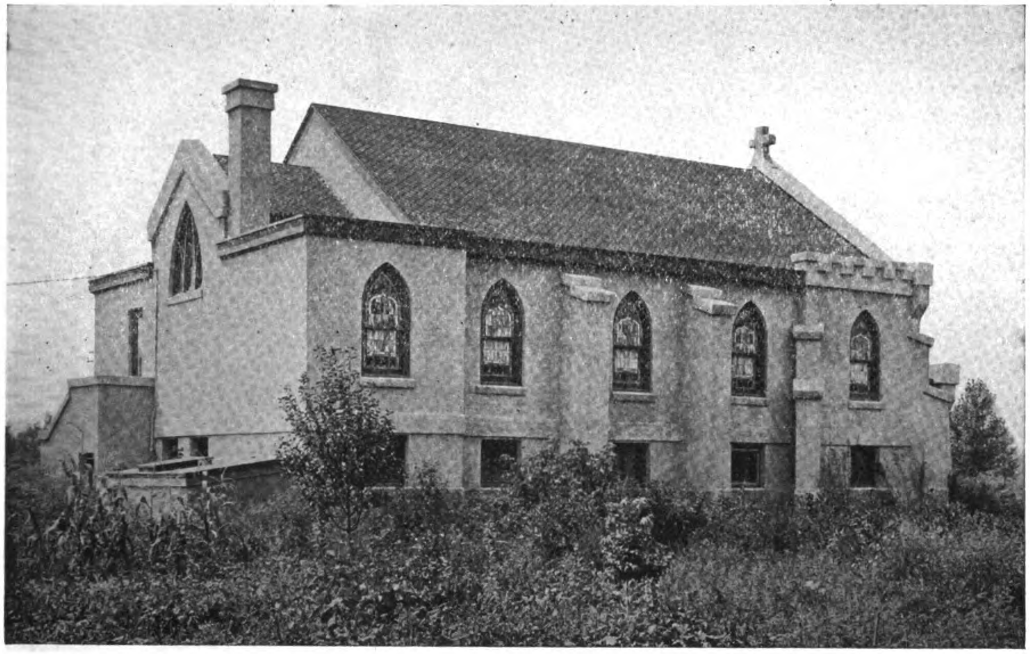
Cement wainscot around toilet room walls about 6 ft. high, top to line up with concrete foundation walls. These wainscots are of Keene cement.

For waterproofing the tile walls there was put on one good coat of No. 232 Toch Bros. "R-I-W" over all inside surfaces of tile, with every part of the wall thoroughly coated. Where porous or absorbent tile presented a reddish-brown appearance after the application of one coat, it was recoated. All walls when finished had a uniformly black appearance, the plaster being applied after 24 hours.

Outside plastering on tile work and exposed frame walls, chimney and gables was three coats of cement plaster. The plaster was applied directly to all tile work after thoroughly wetting the tile. The first coat was applied under pressure and well scratched before setting. Exposed frame walls at rear of auditorium and at sides of altar were plastered on galvanized Herringbone expanded metal lath, No. 24 gauge. Each sheet was drawn taut and lapped each side and end at least one mesh. Metal lath was made continuous around all corners by a one-piece turn.

For the scratch coat the contractor applied at least 100 lbs. of "Stonekote" scratch coat on each 2½ yds. of net surface, scratching the surface with an ordinary house broom, working both sides of all corners at once, having angles true to line and one solid piece. The corners were not stripped and this coat was allowed to dry at least 4 days before the application of the second coat.

For the second coat at least 100 lbs. "Stonekote" was allowed for each 2½ yds. net surface, going all the way round with solid corners. This coat dried out before applying the third coat.



Left Side and Rear Views of Hollow Tile Church at Ardmore, Ill.

For the final coat there was used waterproofed "Stonekote" rough cast, finished in workmanlike manner to secure an even rough surface.

All plaster was laid well into the tile and expanded metal lath and run on uniformly to the required thickness. Care was taken to see that no laps were made and that the job presented a uniform surface.

The girders supporting the first floor, trusses and all exposed roof framing in main auditorium and entrance hall are long-leaf yellow pine. All other framing throughout is No. 1 yellow pine.

The main auditorium floor is supported by 8 x 14-in. yellow pine girders, with 2 x 6-in. joists sup-

ports bolted to girder every 2 ft. with ¾-in. bolts. Girders are anchored at ends and strapped together at the columns.

The floor joist center spans are 2 x 10-in. placed 12 in. on centers with one row of 1 x 3-in. bridging. Floor joists spans are 2 x 8 in. placed 12 in. on centers. The joists are doubled opposite the buttresses and furnished with anchors at buttresses and straps across the girders to form a continuous tie between the buttresses. The joist anchors between buttresses are spaced evenly and the joists anchored to the front wall every 5 ft.

The altar floor joists are 2 x 10 in., also placed 12 in. on centers and supported on side partitions. Altar steps stringers are 2 x 12 in., placed 16 in. on centers, resting on basement partitions at lower end and double joist at upper end. Joists are anchored to the rear wall every 5 ft.

Part of the floor inside the choir railing is raised 18 in. above the main floor level on 2 x 4-in. studding placed 16 in. on centers, with double 2 x 4-in. cap and base plates on which the 2 x 6-in. joists 16 in. on centers are laid.

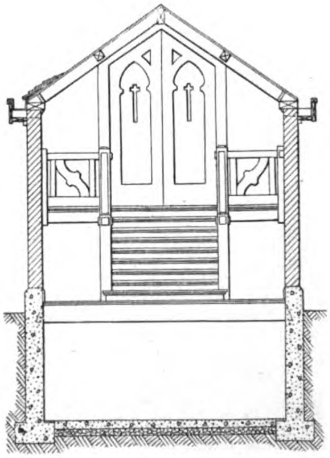
The floor joists of choir room and sacristy are 2 x 8's, supported on the rear wall and partition.

The entrance hall landing has 2 x 10-in. joists placed 12 in. on centers with one row of bridging. The stair stringers are 2 x 14 in.

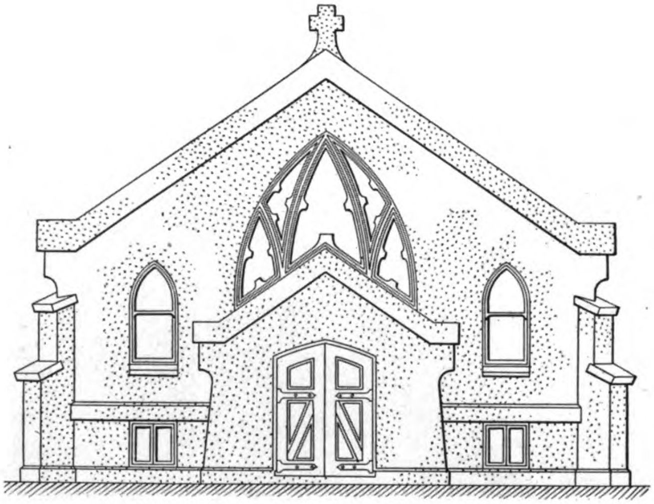
The roof framing over the main auditorium and entrance hall is exposed construction, the trusses, purlins and rafters being dressed on all exposed sides. There are three full trusses and two half wall trusses in the main auditorium. The full trusses are securely anchored to the walls and buttresses. The wall plates on the main auditorium side walls consist of two 2 x 12's, anchored at each buttress with one ¾ in. x 4 ft. 7 in. bolt, and between the buttresses with two ¾ in. x 3 in. bolts.

The wall plates for entrance hall are two 2 x 10's, anchored every 4 ft. to wall with ¾-in. bolts.

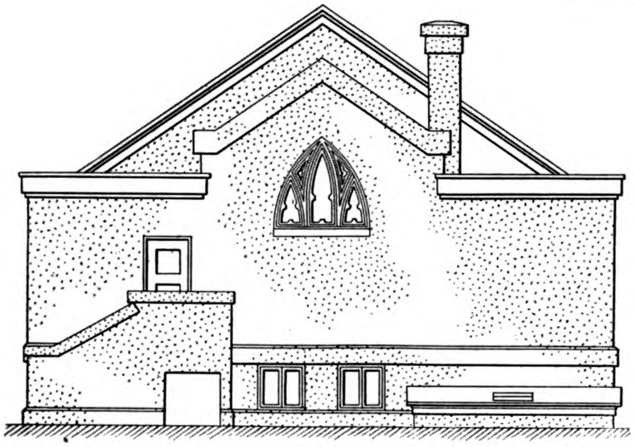
The roof and ceiling joists over choir room and



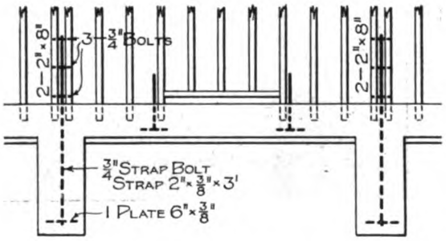
Cross Section Looking from Main Entrance Toward the Auditorium Doors—Scale 1/8 In. to the Foot



Front Elevation—Scale 3/32 In. to the Foot



Rear Elevation—Scale 3/32 In. to the Foot



Details of Buttress and Framing—Scale 3/8 In. to the Foot

Miscellaneous Constructive Details and Elevations of Hollow Tile Church for the Suburbs

sacristy are 2 x 4's, 16 in. on centers, supported on the rear wall and partitions, the roof being pitched towards the rear. The plates on the tile walls for these rooms are two 2 x 10's bolted to the wall with ¾-in bolts.

Roof rafters over altar are 2 x 4 in. placed 16 in. on centers and trussed together with curved ceiling joist cut from 2 x 6-in. stuff.

Roof rafters rest on side walls of altar, extended above choir and sacristy roofs to receive them. The plates on this wall are two 2 x 4's spiked together to the top of the studding. The altar roof is securely anchored to the rear gable and framed to the rear auditorium wall.

The roof joists over the coal room are 2 x 4 in. and rest on 2 x 8-in. plates bolted to the walls.

All interior partitions shown are of 2 x 4-in. studs sized to a uniform width and set 12 in. on centers. Partitions stand on double 2 x 4-in. plates with 2 x 4-in. caps. Where partitions come over each other the studs are continuous from basement floor to caps. Trusses are provided over all openings in partitions and all partitions not supported from below or where required to take loads are also strongly trussed.

Partitions are bridged diagonally with 2 x 4-in. pieces cut in between the studding every 3 ft. in height. Partitions forming rear wall of main auditorium are carried up to support roof and form rear outside wall. This partition is increased 2 in. in thickness above the choir, altar and sacristy roofs to accommodate the truss over the altar arch, this increase being made with 2-in. furring strips spiked to the studs.

A truss is constructed over the altar arch between the arch and the roof, the truss following the form of the arch.

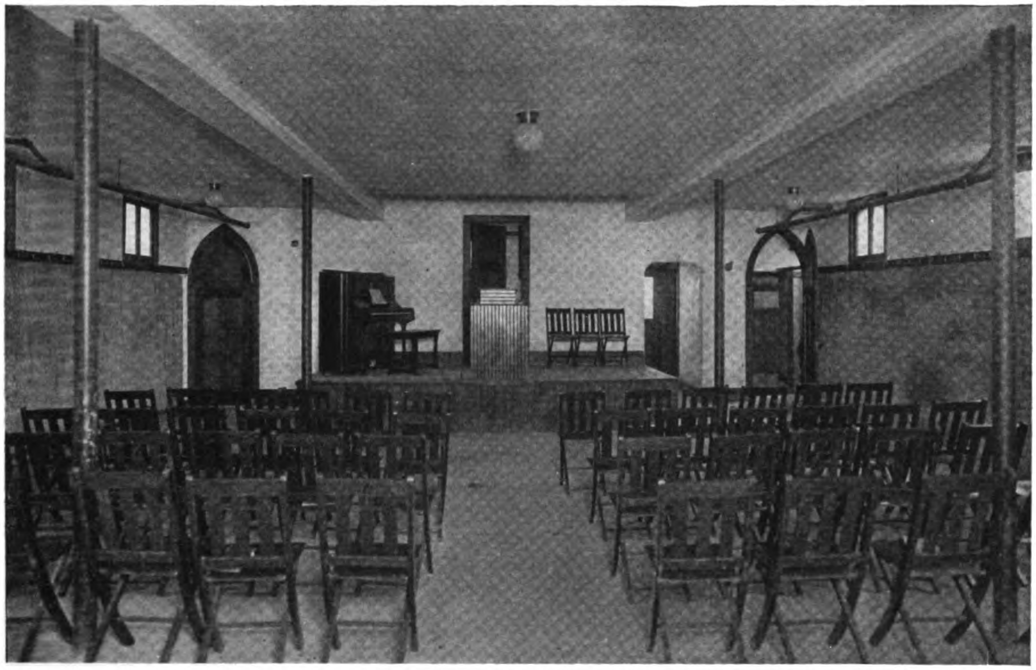
The entire roof over the main auditorium and entrance hall is sheathed on top of the rafters with ⅞ x 6-in. yellow pine ceiling of same quality as interior finish. The beaded side is turned down to form finished ceiling. On top of ceiling roofs is laid one layer of Cabot's double ply asbestos covered deadening quilt, nailing ⅞ x 2-in. strips on top of felt quilt over all rafters and purlins.

All roofs and outside surface of stud walls are covered with ⅞ x 6-in. matched hemlock sheathing and nailed to every bearing with two 8d nails. Over this sheathing was placed one ply of Cabot's waterproof sheathing paper, and over the sheathing paper on exterior frame walls were placed 1 x 2-in. furring strips, 16 in. on centers, ready for lathing, which was covered with "Vulcanite" roofing.

The underflooring of the entire main floor, including the landing in the entrance hall, is covered with hemlock boards. All end joists are cut over a beam and the flooring laid close to walls.

All double hung window frames are arranged for spring catches and do not have sash weights. Basement and entrance hall frames are arranged for casement sash hinged to swing in. All sashes are of cypress and 1¾ in. thick.

All inside finish is hard pine; doors are paneled and moulded stock. The doors, except front en-



View in Sunday School Room in Basement Showing Entrance to Kitchen at Rear of the Platform.—The Door at the Left Hand Leads to the Boiler Room

trance, are veneered on a white pine core. Front doors are 3 in. thick built up of three thicknesses and paneled, and all inside doors are 1¾ in. thick.

Outside doors have rabetted and beaded frames of solid yellow pine. Front door frame is 3 in. thick—all others 1¾ in. thick. Inside doors on main floor have ⅝-in. maple thresholds.

The stairs in the front entrance have maple treads 1⅛ in. thick and ⅞-in. yellow pine risers, the treads having moulded nosings with ¾ x ⅞-in. moulding beneath. Newel posts are built up 6 x 6 in. square with half newels at the top of the stairs.

The entire main floor and entrance hall landing has 13/16 x 2-in. maple flooring, all joints being cut over a bearing in each case, the flooring breaking a joint in every course.

The carpenter-contractor was called upon to furnish a yellow pine pulpit with maple floor and treads.

The building is steam heated by a Pierce down-draft boiler, the radiators in the basement being carried on the ceiling and first floor units standing securely on the floor, two radiators being also provided in the main entrance hall.

The building is piped for gas and wired for electric lighting, the latter including cross on roof.

Plans and specifications were prepared by Architect Arthur U. Gerber, 1247 Edison Building, Chicago, Ill., through whose courtesy we give the cost figures and data on the comparative cost of the different types of floor construction.

The carpenter-contractor was H. C. Haas, Oak Park, Ill.; the mason-contractor was Charles M. Youngberg, and the plastering contractor was Knudson Bros., both of Ardmore, Ill.

Detailed Estimate of Cost

Outside walls, cement plaster on hollow tile. Interior walls, frame. Open timber roof. Vulcanite shingles and concrete foundation to grade.

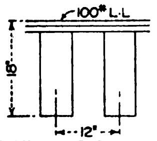
Excavation, 385 cu. yds. @ 50c		$192.00
Concrete foundation, 63 cu. yds. @ $7.00		441.00
Tile walls, 2928 sq. ft. of 12 in. wall @ 30c =	$878.00	
348 sq. ft. of 8 in. wall @ 20c =	70.00	948.00
Outside plaster, 384 sq. yds. @ $1.25		480.00
Inside plaster (auditorium floor), 391 sq. yds. @ 40c		156.00
Inside plaster (basement), 340 sq. yds. @ 40c		136.00
Basement floor, concrete, 1530 sq. ft. @ 10c		153.00
Auditorium floor, 12 squares @ $40.00 per square		480.00
Altar, sacristy and choir room floor, 272 sq. ft.—	40	
Entrance 130 sq. ft.	squares @	
	$29.31	
402 sq. ft.		117.00
Shingles, 20 squares @ $7.00		140.00
Gravel roofing, 1.5 squares @ $4.50		10.00
Roof sheathing, 22 squares @ $4.30		95.00
Wall sheathing, 1.5 squares @ $4.30		7.00
Wall furring, 1.5 squares @ $2.60		4.00
Insulation, 24 squares @ 50c		12.00
Frame walls, 12 squares @ $5.00		60.00
Main roof framing, 16.4 squares @ $12.00		196.00
Roof framing, entrance, 8 squares @ $6.00		48.00
Gutters, 102 ft. @ 30c	$30.60	
Downspouts, 80 ft. @ 20c	16.00	
Flashing, 164 ft. @ 16c	26.24	73.00
Painting and staining		100.00
Hot water heating, 400 sq. ft. radiation @ $1.00		400.00
Electric lighting, 33 lights @ $3.00		100.00
Millwork, glass and hardware		968.00
Stair work		100.00
Outside cornice, 100 ft. @ 30c		30.00
Plumbing		400.00
Total cost of material and labor on 40c per hour basis		$5846.00
Add 37.5% on 50% for 55c labor		1096.00
		$6942.00
Total cost of material and labor on 55c per hour basis being as built		$6942.00
10% contractor's profit		694.00
Total estimated cost		$7636.00
Actual cost as built		$7700.00

Comparative Estimate of Different Types of Floor Construction

These show great saving possible with one row of columns over clear span. As built a still greater saving was effected by using two rows of columns.

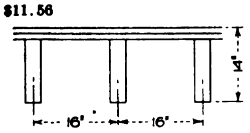
Cost of Floor in Main Auditorium for Clear Span in Basement with Yellow Pine Joists.

6"x16" joists, 12" centers	$40.95
No. 2 y. p. under floor	3.74
Paper	.50
No. 1 select maple floor	12.27
Varnishing	4.40
Per square	$61.86
12 squares @ $61.86	$742.32



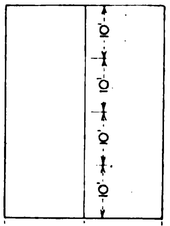
Cost of Floor with One Center Girder and Three Columns.

3"x12" joists, 16" centers		$11.56
1—10"x12" y. p. girder 10'0" long,		
1—6"x6" y. p. posts, 8'0" long 124 B.M. @ $42.00	$5.20	
8 stirrups @ $1.30 each	10.40	
2—12"x12"x½ plates, 41 lb. @ 3c	1.23	
1—⅜"x2" plate, 2'0" long, 5 lbs @ 3c	.15	
1—2.5' x 2.5' x 1.5 concrete base, ⅓ yd. @ $7.00	2.33	
	$19.31 ÷ 3 =	$6.44
No. 2 y. p. underfloor		3.74
Paper		.50
No. 1 select maple floor		12.27
Varnishing		4.40
square		$38.91
12 squares @ $38.91		$446.92



Cost of Floor with Steel Beams

12" I @ 27½#, 32'0" long	880#
2 anchors @ 3#	6
24 ⅜x⅝ hook bolts @ 0.3#	7

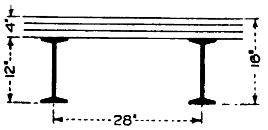


893# @ 3c = $26.79 per beam

Supporting 2.33'x30' = 70 sq. ft. =

$$\frac{\$26.79 \times 100}{70} \ \$38.30$$

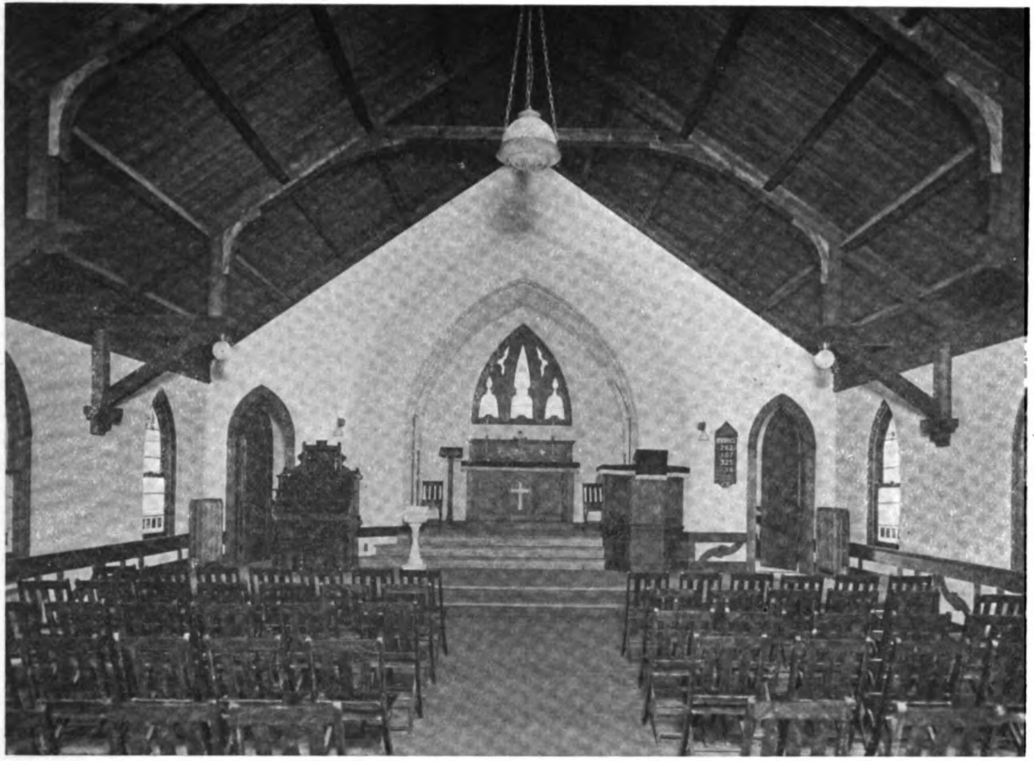
No. 2 y. p. underfloor	$3.74
Paper	.50
No. 1 select maple floor	12.27
Varnishing	4.40
Furring, 2"x4", 16" centers	2.18
Per square	$61.39
12 squares @ $61.39	$736.68



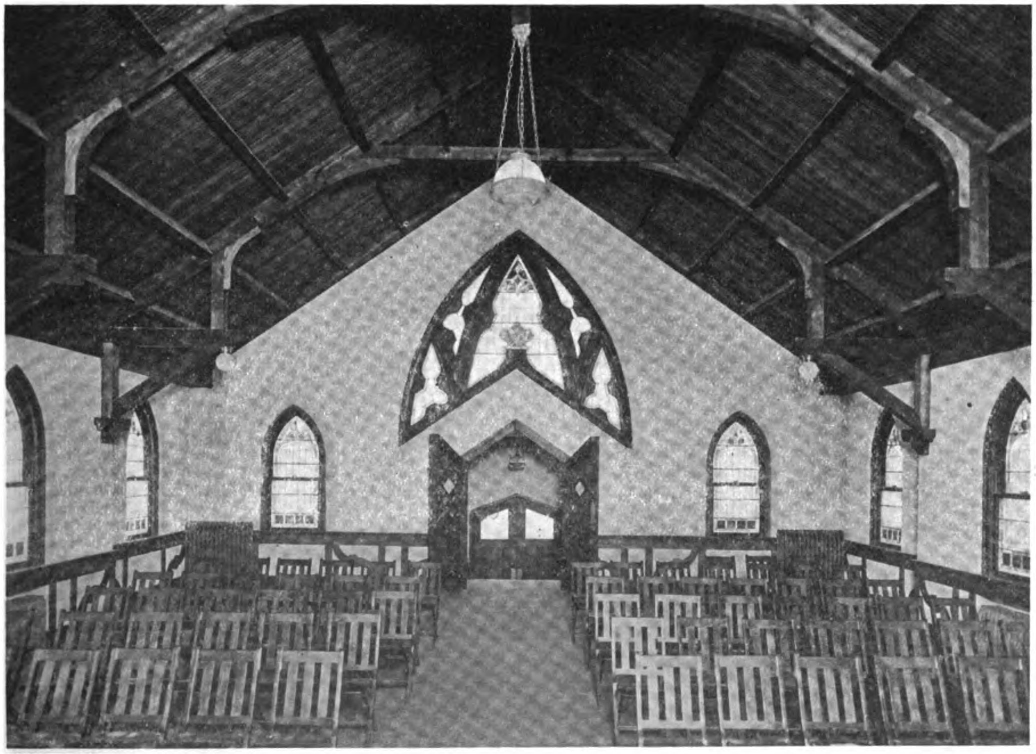
As the church here described was erected a few years ago, since which time building costs have very largely advanced, the above prices will not apply at the present day.

Novel House Moving Operation

Several times we have referred in these columns to important house-moving operations on the Pacific coast, one of them having to do with the transportation of the Ohio state building at the recent Panama-Pacific Exposition by means of barges towed by tugs across the bay for a distance of many miles to its new location. The latest undertaking of this nature was the placing on a barge of the Virginia state building at the Panama Exposition and towing it across the water to Santa Venetia about two miles from San Rafael where it will become the home of the Washington Club. The Virginia building was modeled after the home of Washington in Mount Vernon and now instead of facing the Potomac, it will face the waters of Santa Margarita Canal, an inlet of San Pablo Bay where it commands a splendid outlook of water while the background consists of forests and hills. The grounds are terraced just the same as they were in Mount Vernon and in every respect it is the intention to carry out the Mount Vernon idea.



View in the Auditorium of the Hollow Tile Church at Ardmore, Looking from the Main Entrance Toward the Altar



View in Auditorium Looking from the Altar Toward the Main Entrance of the Church

The Art of Scribing

A Branch of the Carpenter's Trade Which Involves a Rather Clever Handling of Tools—What an Expert Has to Say on the Subject

By Owen B. Maginnis

AMONG the many supplementary mechanical operations included in the trades necessary to successful carpentry work is the practice of scribing, it being applicable in almost all trades, although frequently, as in iron and stone work, it is usually termed "fitting" or "fitting to or into," but in carpentry, joinery, woodworking, stair building, etc., coping or scribing are the most usual and perhaps the correct terms.

Primarily it might be said again that the work is "scratched to" by tools especially intended for that purpose and illustrated in Fig. 1, where a metal scriber is depicted, but for general marking work the wing dividers shown in Fig. 2 or the spring calipers in Fig. 3 are mostly employed, the latter being best for the harder woods such as oak, maple, etc., or on polished varnished surfaces or again on marble, onyx and bronze by reason of the hard tempering of the steel points.

Fig. 1—A Single Point and a Double Point Scriber

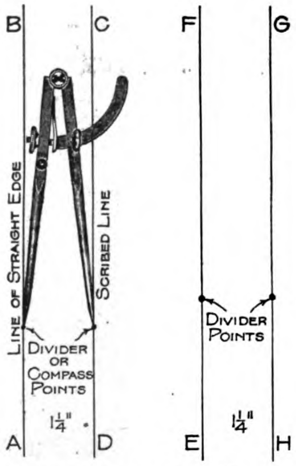


Fig. 2—A Pair of Wing Dividers Illustratitng the principle of Scribing

Fig. 3—A Pair of Spring Calipers

The principle involved in scribing can be easiest explained by means of Fig. 2, where it will be noticed each point on the leg of a pair of ordinary carpenter's dividers is supposed to have "scribed" or marked two lines parallel to each other as *A-B* and *C-D*. The left leg *A-B* sliding against a straight edge it follows that the line *C-D* will also be straight, but should the line scribed to be curved or crooked like *E-F*, then the line *G-H* must of necessity be likewise irregular and curved and follow the outline of *E-F* from end to end.

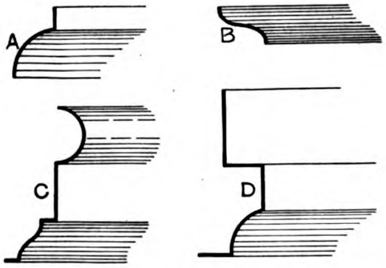


Fig. 5—Coped or Scribed Ends of Moldings

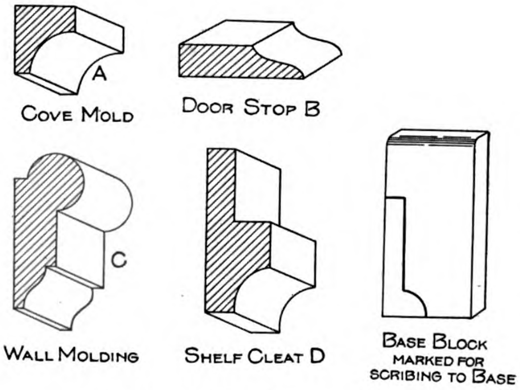


Fig. 4—Sections of Various Moldings

The Art of Scribing—Various Tools Used in the Work

The value of this simple method will be appreciated by a study of the sections of moldings in Fig. 4, where cross-sections of three elementary moldings are given with one shelf cleat and one base block. On rentrant or inside angled returns, these details must be coped or scribed to the curvature of the members each to each in the manner indicated in Fig. 5, where the ovolo *d* fits into the cove *a*

in Fig. 4, the door stop *b* into *b* of Fig. 4. The picture mold *c* to *c* in the same figure and the end of the shelf cleat *d* to *d* by the same method so that coped or scribed cuts are really the reverse of the actual contours of the surfaces and moldings. At the bottom is shown a base block scribed ready for sawing out to fit on the left side corner against the baseboard.

The five samples of cross or sawn sections of baseboard illustrated on the upper part of Fig. 6 have their right and left hand inside return corners scribed. For example, *A* directly under *D* is the correct shape of the end as scribed and sawn to fit closely; *B*, the second section, has three members, each of which must be scribed and fitted separately from the bottom up as they occur; *C* is something similar to *C*, and *D* and *E* are simple. Frequently baseboards are from 8 in. to 16 in. wide and have several members and moldings, all of which must be scribed to close joints.

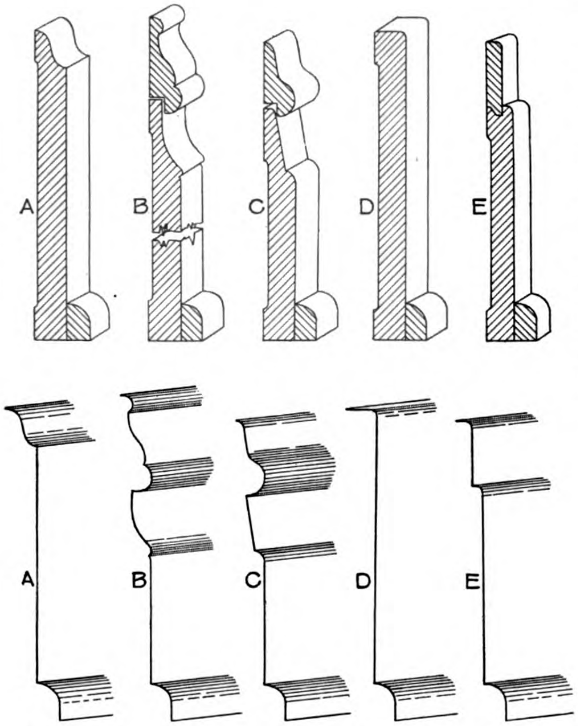


Fig. 6—Sections and Scribed Ends of Various Forms of Base

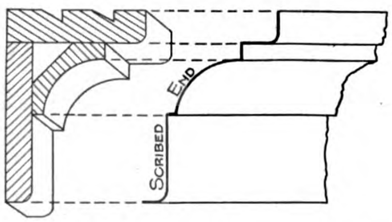


Fig. 7—Section of a Plate Shelf or Rail with Scribed Right-Hand Return End

The Art of Scribing—Various Forms of Base: Also a Plate Shelf

Concerning bronze, galvanized or cast iron, marble or zinc, base blocks, molding, plinths and such like materials the same rules apply to them as for wood and the ends must be chiseled, filed or sawn to the exact reverse outline of the surfaces scribed to and slightly beveled under from the outer face surfaces to fit against the piece scribed to. Simplicity and elegance are the keynote in modern interior and exterior finish and trim. Numerous elaborate moldings are not in vogue at present so the scribing workmanship is not so difficult, but it must in every case be carefully executed by experienced and skilled workmen.

We see in Fig. 7 the end wood of an oak plate or Dutch shelf, as many call it, with its necessary returned scribed adjoining piece, the dotted lines explaining how each member fits to its fellow.

Right here we might draw attention to the use of a miter box in scribing. The mitering of moldings and trim is too familiar to readers of the Building Age to require extended description here, yet it will be found that if in scribing work any of the moldings given in this article or of any other profiles whatsoever, they are first sawn in the miter box to a 45 deg. angle cut will give the exact coped or scribed shape. For this purpose many excellent cabinet makers, carpenters, marble workers, etc., employ a deep miter box or the bevel set to the necessary angle.

For intersections on acute and obtuse angles involving details resembling those shown in Fig. 8 there will be demanded a different slope to the back according to the angle of each joint, which can only be determined by the direction of each piece as shown on the plans and details furnished by the architects and which each mechanic must thoughtfully consider before he commences to manipulate the materials. It must be remembered that these details generally come from the shops and factories finished and ready to set up so that the utmost care and precision must be exercised so that the workman will be sure of the accuracy of each cut, fitting and scribing in order not to waste stuff or time.

More particularly is this true of sheet metal, which cannot be pieced out like wood, especially as to ceilings, likewise too of marble, onyx and the valuable stones which are very expensive and ornate must have the highest of skill expended on every detail in order to obtain a perfect result.

In any of our first-class hotels, public or office buildings erected in recent years scribed work in wood, metal, stone and marble may be seen in evidence with the joint workmanship so finely done as to be invisible to the naked eye. Now we show an onyx cap or door cornice in a corner of the hall of an office building, Fig. 9, scribed on the right-hand corner. Let me here advise that interior mitering on inside angles can never be satisfactorily done, as the settlement of a wall, the jarring of a door, etc., will put it out of place and spoil the joints, but if

scribed joints be employed, the work will be stable and ornamental.

In the absence of dividers many simple expedients may be used in scribing. For instance, a ⅞ in. or 1 in. block placed against a wall or piece of base or shelf board with a lead pencil drawn across the piece will give the exact direction of the saw cut. Similarly with a 1¼ in. or 1½ in. block or a piece of the woodwork or metal itself as wrought may be set on end and the piece to be scribed marked out with a pencil or point scriber or again stiff sheet paper or cardboard will make an excellent handy pattern to mark scribed ends from, if they be many in number.

A scribed marble base or skirting is represented in Fig. 10, and here we find one of the most difficult forms of scribing known to building science, as each joint on top of each stair tread and nosing demands the most tedious and neatest fitting. It is usually done with dividers or from the steps themselves, but this is a long and serious job and is generally executed by experienced stair builders in stone or wood.

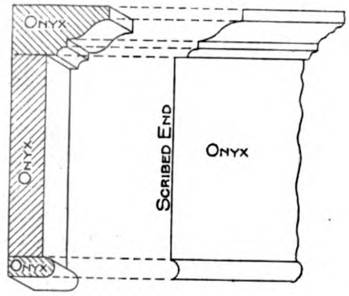


Fig. 9—Marble or Onyx Door Cornice or Window Head with Its Scribed End

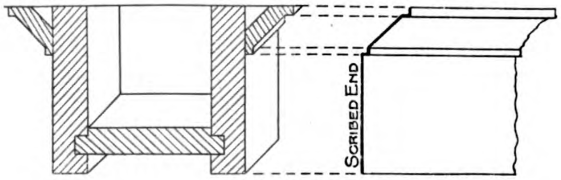


Fig. 8—Section of Ceiling Beam With Its Right-Hand Scribed Return End

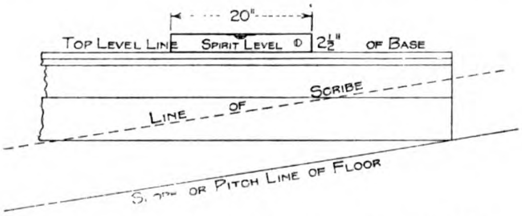


Fig. 11—Scribing Where the Floor Slopes or Pitches

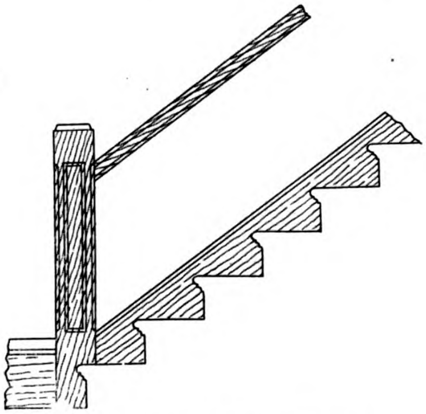


Fig. 10—A Scribed Base or Skirting

Various Kinds of Work in Connection with Which the Art of Scribing Is Used

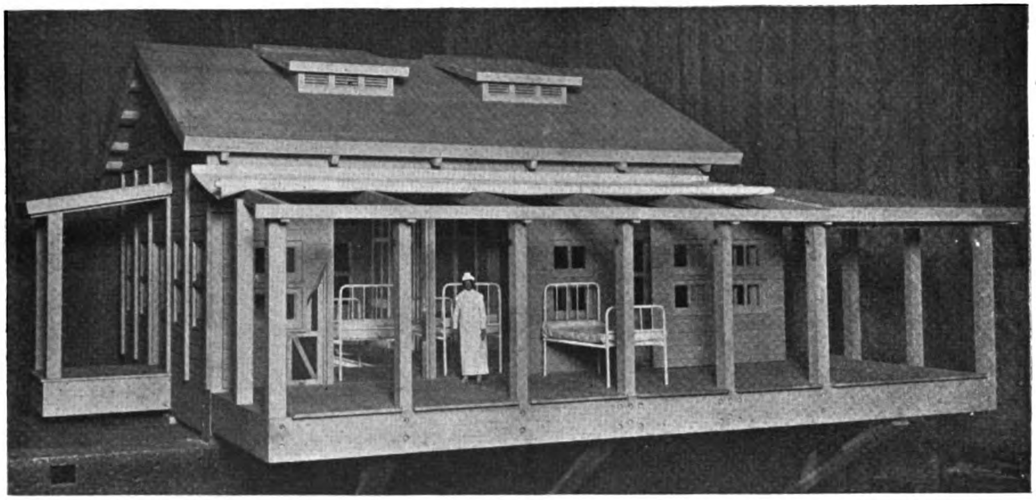
Among the more important kinds of work for which scribing is used are the fitting of trim on door and window jambs to plastering on walls or to bare brick walls where the surfaces are uneven or out of plumb. In these cases it is usual to tack the casings temporarily plumb to the edges of the jambs and scribe down with the dividers. On floor base the same methods are practised except in the examples illustrated in Fig. 11, where the floor is on a grade so the piece must be tacked to the wall with a spirit level placed on its upper edge to insure its position and then the bottom side is scribed to the pitch of the floor as indicated by the dotted line.

Time and care are necessarily expended on the operation in order to maintain its accuracy.

Finally it might be said that only experience and the mechanic's own good judgment are the safe guide as to when the art of scribing may be necessary and successfully applied, but it should be cultivated and practised as a part of the education of those in the trade who may be called upon to do work of this kind where it is essential.

A general contract has just been awarded for the erection of a six-story show room and office building at the northeast corner of Broadway and Fifty-fourth Street, New York City, the estimated cost being about $300,000. The building will occupy a site 129.6 x 54.7 ft., and will be occupied exclusively by the Ford Motor Company. The site was to have been improved originally with a sixteen-story combination office building and hotel, the upper floors of which were to be leased to the Hotel Woodward adjoining. The contract has been awarded to the Longacre Construction Company, and the architects who prepared the plans are A. Kahn and E. Wilby.

The Government is reported to have reached a decision that tree-nails or wooden pins used in shipbuilding must be of locust or eucalyptus. The black locust will be the particular species used.

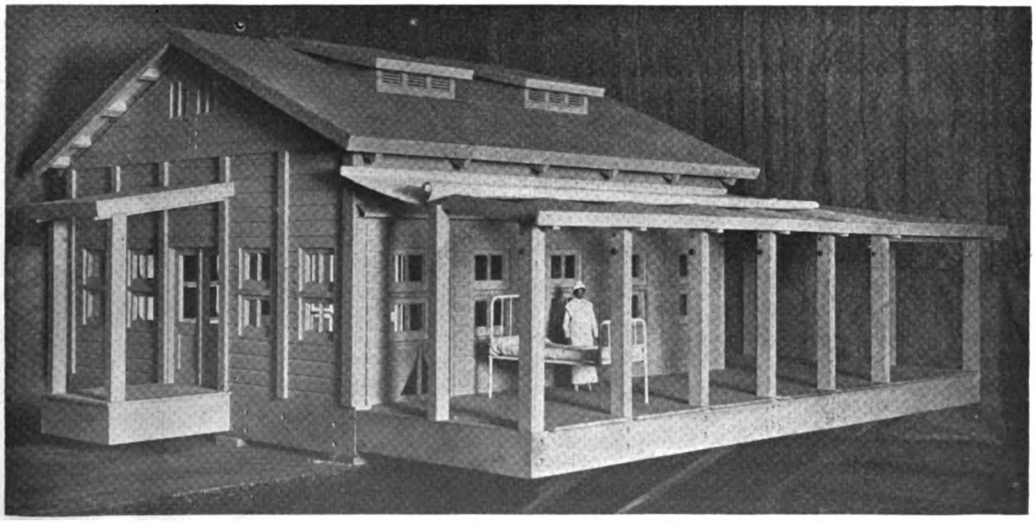


THE MODEL OF THE FIELD HOSPITAL WARD SHOWING TWO OF THE SIDE SECTIONS OPEN

The Liberty Field Hospital Ward

A Unit Construction Which Is Portable in Form and May Be Converted Into Dwellings

AT the present time great interest attaches to all forms of hospital construction for use under any climatic conditions, and every one is therefore likely to give more than passing attention to the pictures which are here presented, showing as they do a model of what is known as the Liberty Field Hospital Ward, adapted to army, Red Cross, Y. M. C. A., and canteen building types. It is of the unit construction, and can be converted into dwelling houses of any size, in multiples of 5 ft., and used in the reconstruction of devastated towns and villages in the present war zone. The model represents the latest features of the British and Canadian army hospital design, and the details of the plan were worked out by H. F. Beers, superintendent of construction in the Museum of Natural History of New York City, under the direction of Dr. Henry Fairfield Osborn, president of the institution. Dr. Osborn has for several months been making a study of the housing conditions in the cantonments, and has been in close touch with leading army surgeons in Europe. We understand that

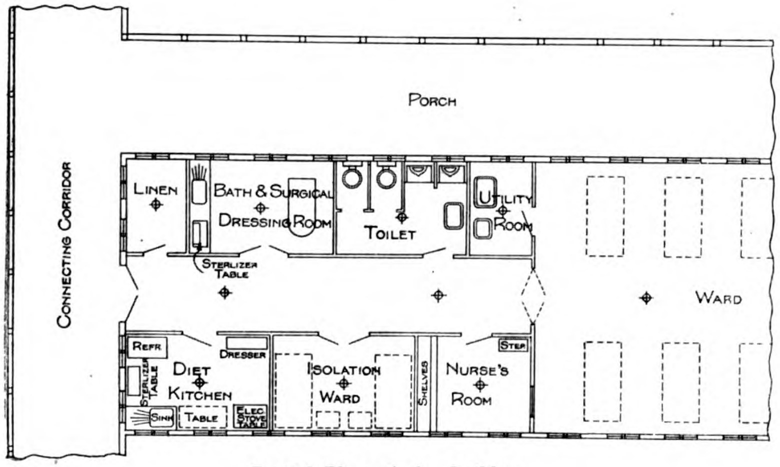


Another View of the Field Hospital Ward Showing All Sliding Side Sections Closed

the specifications are now being considered by the Federal authorities.

The hospital is so ingeniously fashioned in 5-ft. units that it can be erected or removed readily by unskilled labor. The collapsible parts can be packed in small space either for shipment over seas or for transportation on motor trucks. All the work on hospitals of this kind could be done by few men, as the structure would be shipped from this country as a finished product.

Hospitals built in accordance with the plan here indicated can be arranged in various sizes, but an average one would be 24 ft. in width and from 150 to 160 ft. in length, with a height of $17\frac{1}{2}$ ft. to the ridge of the peak roof. Owing to the hung ceiling, there is a large air chamber above it, which serves for ventilation and insures an even temperature in all weathers, this being one of the most important features of the structure. There are quickly adjusted ventilating devices overhead which can readily be reached with a hook by the nurses and attendants.

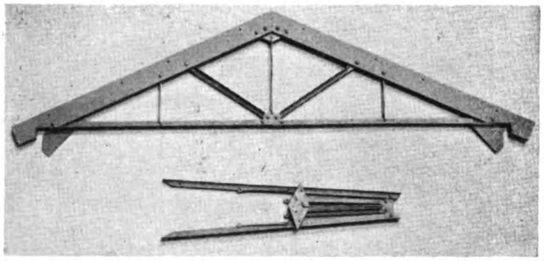


Partial Plan of the Building

The air circulates through louvres at the top of the building and at apertures under the eaves. There are also air chambers in the sections of walls, and additional protection against the variation of the thermometer is assured by thicknesses of paper in the cellular fabric. The floor is built in the same way, and it is intended that foundations of the building shall be protected against the wind. An idea of the floor construction is indicated in one of the pictures presented herewith.

The side sections can readily be pushed out from their accustomed alignment into a small track at the top of the outer walls and shoved entirely out of the way. All the sides of the hospital can thus be exposed on warm and pleasant days, or the panels may be so manipulated as to screen half of the length as shown in one of the pictures.

On one side and at one end are commodious porches, the supports of which are held in place by devices similar to the steel hooks used in binding together the joints of old-fashioned beds. The roof of this veranda is of canvas, and can easily be rolled and unrolled. The convalescent soldiers will thus have the opportunity to sit in comfort in the open air, well outside of the ward.

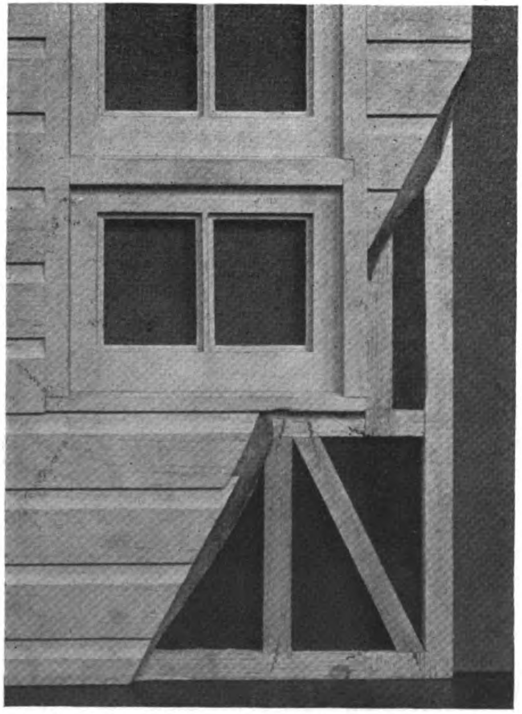


The Roof Truss Folded, and Also Assembled for a 24-Ft. Span, 6-Ft. Rise

The pictures which are represented herewith show the porch side of the building, also with some of the panels opened, and also with the panels closed.

The interior partitions of wood with Compo board panels separate the space into convenient wards, kitchens and nurses' apartment.

It was intended that however efficient the structure might prove as a hospital, its future use was to be considered on a parity with its present mission. The parts are



Showing the Construction of the 5 x 8 Ft. Sliding Side Panels

adjusted with such care that the buildings may eventually harbor thousands of homeless returning to the devastated areas of Belgium and France. Given the two ends of the hospital, as many units as required for the housing of a family could be utilized. The material is cedar, which, under normal conditions, would last for many years. The end panels are 4 ft. 9 in. by 8 ft., and those on the side are 5 ft. wide by 7 ft. deep.

The floor sections are 5 x 7 ft., and the ceiling panels are of the same dimension. As each side section has two windows, the houses of the rehabilitation would be light from the beginning. The partition panels are 5 ft. wide and 11½ ft. high.

The roof trusses are of steel, so ingeniously hinged that they can be folded into small compass, as shown in the illustration, transported easily, and then opened up again like gigantic jackknives.

Although the temporary hospital of the new order was intended to be heated by steam from plants outside the walls, the dwelling houses to be constructed later from the several units could easily be warmed by means of stoves.

This model of hospital was on exhibition in "Hero Land" at the Grand Central Palace, where it attracted a great deal of attention on the part of the visiting public. Within it were manikins of nurses and soldiers, as well as beds and other equipment, in exact scale. The model was, therefore, a realistic representation of the service proposed.

The floor plan presented in connection with the various illustrations affords an idea of the executive end of the building, while the small portion of the ward indicated conveys an idea of the manner in which the many beds are arranged.

We are indebted to the Museum of Natural History for the photographs from which our halftone engravings were made.

Some Echoes of the Noon Hour—V

A Few "Kinks and Wrinkles" That Are Worth While for the Carpenter to Remember

By Edward H. Crussell

"WHAT has become of that new fellow?" asked Shorty of the Kid, as he brushed the crumbs off the front of his overalls and settled himself into a more comfortable position. "What was the argument between him and the Old Man, early this morning?"

"Old Man fired him," answered the Kid; "the argument was about the new fellow's way of building a scaffold. He took two or three lengths of that new flooring to brace it with, and when the Old Man asked him why he didn't pick some pieces out of the scrap-pile, he said that no one had told him to. The Old Man told him plenty after that, but it was more about solid ivory than scaffolds, and he wound up by calling him an earthquake carpenter. What did he mean by that?"

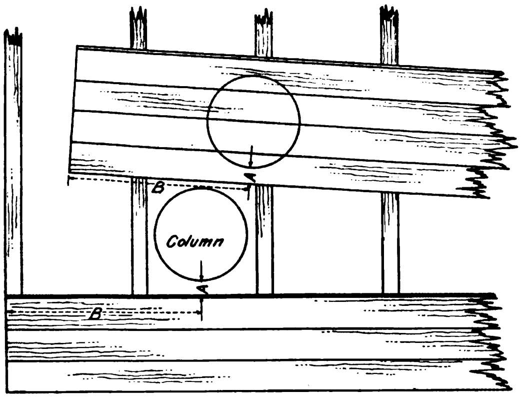


Fig. 7—Scotty's Method of Fitting Flooring Around a Column

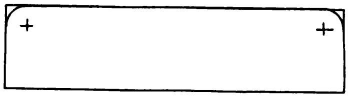


Fig. 8—Corners of Shelf Marked with Compasses

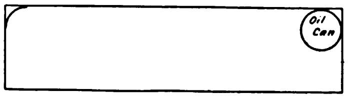


Fig. 9—Corners of a Shelf Marked with an Oil Can

Some of the Various "Kinks" and "Wrinkles" Described by the Author

"By golly!" ejaculated Bliss in surprise; "how *Tempus* does *fugit*, to be sure. Who'd think it was nearly twelve years ago since the San Francisco earthquake and fire. You must have been

going to the kindergarten at that time," he explained to the Kid, "and, of course, the term 'earthquake carpenter' would be strange to you."

What Is Meant by an "Earthquake Carpenter"

"There was a big demand for all kinds of building mechanics in San Francisco immediately after the fire, especially for woodworkers, and anyone who knew which end of a hammer to take hold of, and some who hardly knew that much, had no difficulty in getting a job. Not only were the contractors looking for men, but business men, storekeepers, landlords, etc., who knew there was no chance to get a contractor to consider a small job, all these were on the carpenter's trail, and it was as much as a fellow's life was worth to walk down the street in a suit of overalls during working hours. I carried a level to work one morning, and two Hebrew storekeepers nearly tore the clothes off my back. They, no doubt, would have done so, had they not started fighting over the question of which one of them saw me first.

Mechanics in Great Demand

"I accepted dozens of jobs during the first few weeks; jobs that I had no intention of going near, because that was really the only thing a fellow could do, when the other fellow wouldn't take 'no' for an answer. Under these conditions it is easy to understand that some of the woodworkers were wonders, and some of their equipment more wonderful yet. I remember one fellow whose toolchest was a dry-goods box fitted with a pair of leather hinges, and contained a paint brush, a shoemaker's hammer, a pruning saw and a couple of turning chisels. Sort of an outfit a movie comedian would start out with. This guy lasted for a day or so by borrowing from his workmates and keeping out of sight as much as possible, but at the end of that time the boss caught him trying to bore a hole by swearing at the bit and turning the brace in the wrong direction, so he started him on his travels again.

Earthquake Carpenters Not Wanted

"After the first few months, mechanics coming in from the outside made it harder for these fellows to get a job. The man in charge would ask for their card, look at the date of it and say, 'Hum, got any other card? No. Earthquake carpenter, eh? No room here.' And that was the way the term originated. It's been some time since I've heard it and I'm a little surprised at the Old Man using such an out of date expression, he must be losing his grip."

"Well, Bliss," commented Shorty, "I was never in San Francisco, but I'll take your word for what you say about it, though I know lots of people who wouldn't."

"I wasn't in San Francisco either," said Scotty, "but I was in South Africa after the Boor War, and when it comes to tales of earthquake carpenters and their like, I could believe anything. I remember one instance in particular, where a couple of these cobblers were laying floor in a basement; they had to fit the flooring around a wooden column and for a while were stuck as to the method of doing so. After discussing the matter, they placed several pieces of flooring together, set a nail keg on top of it, and ran a pencil line around the nail keg. The nail keg was larger than the column, but that didn't bother them any; in fact, they seemed quite proud of their solution.

Laying Flooring Around a Column

"I remember thinking at the time how strange it was that men who knew enough to place the flooring together before marking it, didn't know how to draw a circle; because I've seen plenty of men, before and since that time, who knew all about marking circles, and yet when it came to fitting flooring or sheathing around pipes or columns, they'd try to fit the pieces singly by scribing them.

"To my notion, the best way of doing the work is like this: Lay the flooring up to the column, as in F. 7, and then, over to one side, put enough pieces of flooring together to make the width of the column, measure the distance between the last piece of flooring laid and the nearest part of the column, shown at A in the sketch, strike a circle the size of the column and saw it out.

Rounding Off Corners of Shelves

"Just to show you how true it is that we may learn something useful from everyone with whom we come in contact, I might tell you that years after the South African incident, I was one day working at the bench, hurrying to finish a job that had to be completed in time to be shipped on a certain train. I had to round off the two corners of a shelf, and while mentally bemoaning the loss of time necessary to hunt up my compasses and mark the corner, as in Fig. 8, I suddenly remembered the two Dutchmen in South Africa, grabbed up my oil-can, which was sitting on the bench, slapped it on the corner of the shelf, as in Fig. 9, and ran a pencil line around the desired quadrant.

Some of the Devices Used for the Purpose

"This method is so much quicker and handier than measuring and marking with compasses, that I eventually accumulated a collection of various sizes of washers, which hung on a nail near my bench ready to mark any portion of any circle within the limit of their size. I have sometimes used a quarter or a half-dollar for the same purpose, but not often, because it is usually a bigger job for me to hunt up a quarter than it is to hunt up the compasses."

"When you speak of compasses and portions of circles," said Old George, "I am reminded that twenty-five or thirty years ago, before the days of open plumbing, when the carpenter did all the

woodwork in every room of the house, including the kitchen and the bathroom, it was thought to be quite a trick to be able to correctly mark out a toilet seat, and there was often as much discussion over the matter, as we nowadays hear over the framing of a hip, or jack, rafter.

"The stairs, too, in those days, were frequently built with windows, which was another source of much discussion. Nowadays the stairs are usually built with platforms, and the plumber is the only one interested in the bathroom. I wonder if, twenty years from now, some inventive genius will have taken the roof away from us also, leaving us nothing to argue about.

"I wouldn't for a moment want to go back to those old days and that old style plumbing, but there was a lot of nice work for the carpenter in one of those old style bathrooms. I remember, as a young fellow on a new job, I once gained a good deal of credit for a stunt I pulled when fitting up one of them. The bathrooms, of which there were two exactly alike, were to be finished in black walnut. There was only just enough wood ordered, and the foreman divided it equally between the two jobs.

"There was an elliptical shaped wash-basin in one corner, and when it came to running the base and apron around this, I took my saw and ripped a ⅞-inch board edgewise, forming two ⅜-inch pieces which bent to the curve easily. The fellow in the other bathroom had never heard of re-sawing a ten-inch board with a hand-saw, he tried saw-kerfing his and had bad luck, so that just about the time I got my job finished, the foreman came rushing in to see how many more feet of walnut he would have to order. He was agreeably surprised to find that instead of wanting more, I had a spare piece that the other fellow could use. He was one of these foremen that are easily pleased with small things.

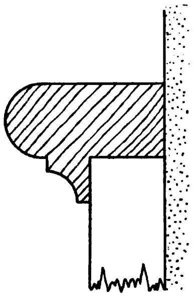


Fig. 10—Stock Pattern of a Wainscot Cap

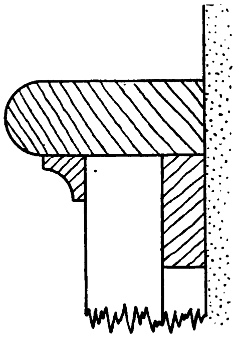


Fig. 11—How "Old George" Made a Wide Wainscot Cap

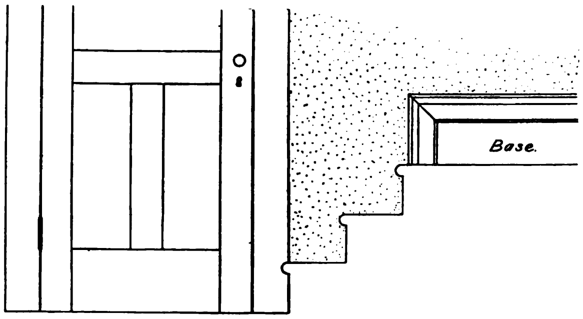


Fig. 12—George's Method of Finishing the Base at the Stairway

Echoes of the Noon Hour—Various "Kinks" Brought Out in the Discussion

"I remember that once, when I wanted a short piece of extra wide wainscot cap, I ripped the molding off a piece of the stock pattern, shown in Fig. 10, rounded up the edge of a board of the correct width, and nailed the molding under it, as shown in Fig. 11, he seemed to think my intelligence beyond the average.

"In the kitchen of this house, there were a couple of steps that led down to the back door, and as the strings were notched and the plaster had been run right down to the treads, it made a rather awkward place to finish the base. I returned the molding of the base down the end of it, like Fig. 12—another thing which he thought worthy of special comment."

"You say he was pleased with little things," remarked the foreman, who had joined the group some time before, "but you want to remember that it is the little things that count. I don't know of anything more soothing to the nerves of an executive than to find, when he has forgotten to give some special instruction for the performance of some particular piece of work, that it has been done as well, or better, without the instruction. It doesn't happen often enough to become monotonous. For myself, I usually try to give out plenty of instruction, early enough to make the instruction worth while.

"Along this line, I want to say that when we start putting on the siding, the proper thing to do is pick out all those pieces that have been damaged along their lower edges and use them in the first course. By ripping off the damaged edges they may be made to serve very well in this course, otherwise they will be wasted.

"In the same manner, when siding is broken along the upper edge, it is usually more economical to save it so that it may be used up in the last course, than to cut out the broken places and use it in short pieces. This is another one of those little things that show the difference between the man that has his mind on his work and the one who has it on the clock, and that reminds me that it's time to blow the whistle."

(To be continued)

Woods Used for Finish and Floors

Some Interesting Comments on What Are Known as Open-Grained and Close-Grained Woods

THE beauty of the finish depends largely upon the kind and condition of the woods used and the care taken in their treatment, says a writer in a handsomely illustrated *brochure* entitled "Common Sense About Interiors" issued by the Lowe Brothers Company. When forests were more abundant than now the number of woods regarded good enough for building was very limited. Now many others are found to be beautiful.

The Difference Between Plain-Sawed and Quarter-Sawed Woods

The difference between plain-sawed and quarter-sawed woods, particularly oak, makes the latter popular for fine work. Plain-sawed lumber is secured by sawing a log lengthwise into as many boards as possible. Quarter-sawed lumber is secured by first sawing the log into quarters, lengthwise, and then sawing these quarters into boards of varying widths. These latter show the grain of the wood with the finest effects, but make the lumber much more expensive.

For finishing purposes woods are generally known as open and close-grained. The open-grained woods are usually hard woods and close-grained soft, though there are exceptions to this division. The leading building and finishing woods may be arranged thus:

Open-Grained Woods

Ash.—Good for interior woodwork or frames—not for floors. May be stained with good effect. Does not take paint well.

Mahogany.—One of the most beautiful woods for woodwork or furniture. There are various grades—some beautiful and hard, some spongy.

Oak.—By far the most popular wood for fine interior finish in all parts of the house, floors and furniture, because of its grain, figure, color, susceptibility to good finish, and medium price. It is hard, either white or red in color, and lends itself to staining in many different ways. Does not take paint well.

Walnut.—A most beautiful wood for dark finish or furniture, but its scarcity makes it expensive. It is hard, takes a fine finish, and is particularly good for dining room, library or large dignified decoration.

Chestnut.—Good for woodwork, but too soft and spongy for floors. May be stained and varnished.

Close-Grained Woods

Birch, Red or Black.—Very popular for interior finish and furniture; not so good for floors. It is especially beautiful when stained mahogany. It has a very fine grain, is often beautifully figured, and takes a high polish.

Bass Wood or White Wood.—Used for interior finish, generally when enamel or paint is to be used over it.

Cherry.—A beautiful wood for woodwork, taking stain well and making handsome finish whether kept in natural reddish tone or in mahogany color.

Fir (Oregon).—A light, soft, rather coarse-grained wood, but compact in structure. On account of the light brown heart wood contrasting with light color of the outer wood, staining may be difficult, but the result is good. For the same reason painting should be three coat work.

Poplar, White or Yellow.—For woodwork or for exterior siding. It is quite soft; expands and contracts quite a little, so that it must be put on when very dry; has a fine grain; takes paint and enamel better than pine, and makes a good effect with stains, especially cherry, mahogany, etc. It is the best of all woods for paint.

Most Widely Used Wood for Building

Pine.—The most widely used of building woods because of its low price, easy working qualities, and readiness to take stain or paint. There are many varieties in this country, the most generally used being southern, Oregon, white, yellow and red. It is used for interior finish, floors and exterior work. It has a beautiful grain; may be stained in almost any of the popular colors with excellent effect; in natural finish it is generally beautiful, and is so used more than any other wood.

Cypress.—A very common wood for both exterior and interior. It is good for finish, but too soft for floors. It sometimes contains considerable pitch, but clear lumber presents no unusual difficulties in staining, varnishing or painting. Special care is necessary to assure absolute dryness before painting or varnishing.

Sycamore.—A beautiful soft wood for interior woodwork. It takes stain well.

Maple.—A very hard and very close-grained wood, particularly popular for floors. It takes varnish and stain well.

California Redwood.—A beautiful, soft wood, sometimes finished in natural color and sometimes in stains for mahogany, weathered and green effects. It is a beautiful light red, hard enough for finish and floors. For interiors it is used most frequently for woodwork, especially with mahogany finish.

A BIRD'S-EYE VIEW OF THE COMPLETED HOUSING DEVELOPMENT AT DONORA, PA.

Building One Hundred Concrete Houses for Workingmen

Standardized Designs and Steel Forms Used to Facilitate the Work—Details of the Operation

By L. G. Dennison

IN various parts of the country industrial establishments have been erecting colonies of houses for their workingmen, the idea being to provide accommodations of a thoroughly up-to-date character at a cost well within the means of the men who are to occupy them.

One of the latest of these industrial villages, as they may very properly be designated, is that being built at Donora, Pa., for the American Steel & Wire Co. At present 100 concrete houses of eight different styles and containing 4, 5 and 6 rooms with bath and cellar are under construction or have just been completed, a few of them being in pairs with party walls, making what are known as "twin houses," but the great majority are detached.

The average floor area is about 26 by 26 ft., and the six-room houses contain living room, dining room and kitchen on the lower floor and three chambers and a bath on the upper floor. All houses are of the box type, with solid concrete walls 6 in. thick reinforced vertically on both faces and horizontally on the outer face with straight rods. The intermediate partition wall cuts down the floor spans to 12 or 15 ft. The floors are of the ribbed reinforced concrete type, with the ribs spanning between the outer and interior walls. In the cellar these ribs are left exposed but on other floors plaster board is nailed to strips left in the concrete and a finish plaster coat is applied.

A View of Some of the Completed Single and Double Houses Which Are Typical of the Operation

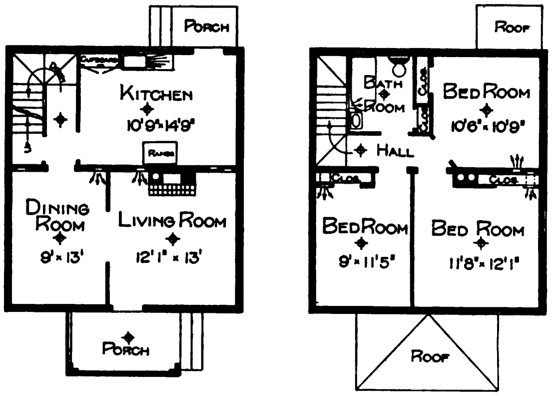
The cornice is of reinforced concrete in which a gutter is formed.

On top of the concrete structure there is a roof of spruce framing covered with asbestos slate. Thus, with the exception of the roof frame, steps, window sashes and door frames the houses are non-combustible.

Each house is equipped with gas, furnace and cooking range, electric lighting and with modern kitchen and bathroom equipment. Costs, including this equipment, ranged from $2,000 to $3,300 for each house. This price does not hold good under present market conditions.

The fact that this work was undertaken and accomplished with such speed and satisfaction was due to the application of methods used on large buildings to the erection of 100 individual establishments. The designs were thoroughly worked out, and standardized steel forms and wooden forms were used on successive rows of houses.

The steel forms are of the special channel type patented by the Lambie Concrete House Corporation, and consist of 9-in. channels which are set up vertically and are connected together with clips and wedges. A 4 by 4-in. steel angle is set up at the corner of the building and the forms are lined up longitudinally by a steel channel used to form a belt course. This not only fastens the forms of the lower floor but is bolted into the floor reinforcement and remains in place as a support for the second-story forms. It is removed after all the concrete has been poured.

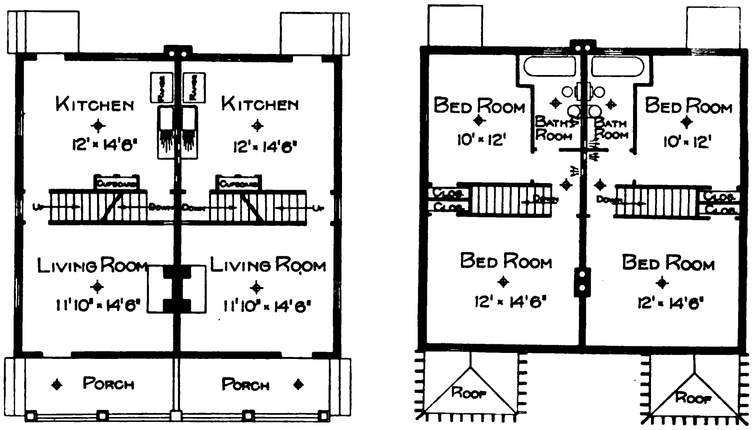


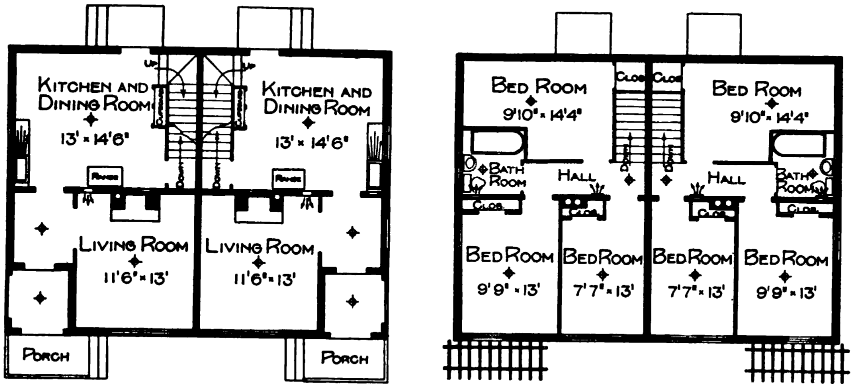
First and Second Floor Plans of a Typical Detached House

The houses were constructed in groups, a set of forms being used for a group and then taken down as quickly as possible and used for the next group. Usually the forms were set up for one story wall and floor together, and then concrete was poured for this section all at one time. To complete one story takes about 7 days, and working at this rate a house of two floors and a cellar is completely concreted in three weeks, and with twelve sets of forms the same number of form houses are completed in this period. Subsequent to this, plumbing, heating, plastering, roofing and finishing must be completed, requiring about 5 weeks more. These twelve houses were completed in the first eight weeks and twelve every three weeks thereafter.

The contract for these houses was taken over by the Aberthaw Construction Company, Boston, from another contractor of less experience when he had completed a few of the houses at a great deal of trouble and expense. The original contractor placed concrete from a high stationary tower with a chute. However, on account of the number of moves of the tower necessary to cover the whole housing area, and on account of the small amount of concrete poured per house, 125 cu. yd. on the average,

At the Right are First and Second Floor Plans of One Type of Two-Family House, the Entrance being directly from the Porch into the Living Room





At the Left are First and Second Floor Plans of Another Type of Two-Family House with Vestibule at the Main Entrance

Typical Floor Plan Arrangement of Three Classes of Workingmen's Houses Erected at Donora, Pa.

the tower method proved inefficient and the cost per yard of concrete was quite high. This cost was further increased by the cost of tower erection and construction.

The Aberthaw Company substituted small Koehring mixers, which were placed beside each house during the placing of the concrete. Wheelbarrows containing the concrete were raised by a small hoist placed on each building.

There was a squad boss in charge of the carpenters and helpers working on each house. This boss had four carpenters and four helpers on the smaller houses and as many as seven carpenters and seven helpers on the large double houses. It was found most economical to work the carpenters and helpers in pairs.

The reinforcing steel boss was under the carpenter foreman. This was found desirable since the steel had be erected rapidly whenever the carpenters were ready for it.

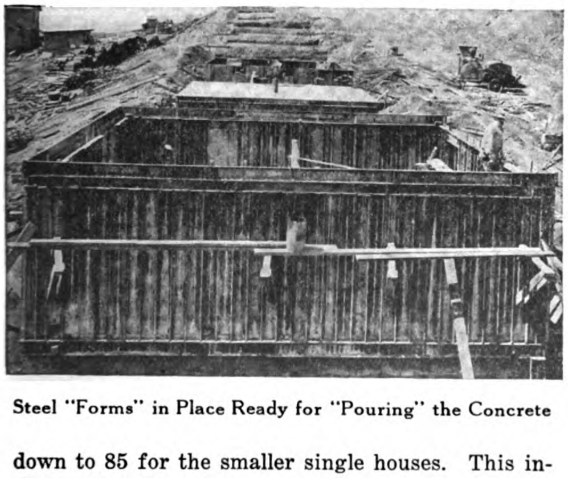
A regular planning department laid out progress each day for the next three days and chose the foremen to erect the forms on each house and the concrete gangs poured them.

Three concrete gangs were at work, two concreting walls and floors and the other doing advance work and the follow-up work, such as footings, pavings, porch walls, floors, steps, window sills, chimneys, etc.

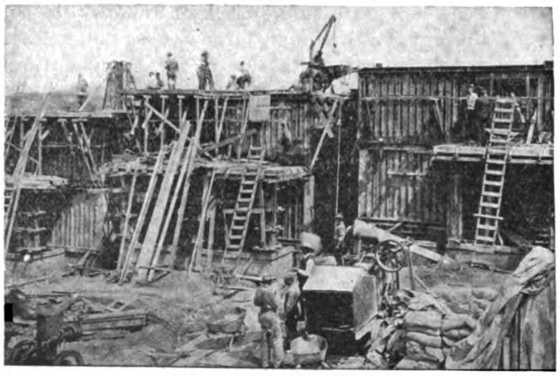
The plant on the job consisted of three 1-bag gasoline-driven mixers, two of which were equipped with the side loaders; three Sasgen peerless circle swing steel derricks; two Novo gasoline-driven hoists. The sand and slag, as well as cement, were delivered to the mixer by truck.

The Sasgen derrick was not used for pouring the basement and first floor, but was used for all concreting above that. It was bolted securely to the belt course on one corner of the building.

The quantities of concrete per house varied from 145 yards for the largest double or "twin" house, down to 85 for the smaller single houses. This includes all walls and floors, footings, pavings, porches and chimneys. It cost about $2.25 per yard to place the concrete in the first and second-story walls, which are 6 inch, and the cost was the same for the floor slabs. The smaller houses have about 15 yards of concrete in the first or second-story walls, and 6 yards in the first and second floors. The roof, including cornice, has about 10.



Steel "Forms" in Place Ready for "Pouring" the Concrete



The Concrete Being "Poured"—Note the Mixer in the Foreground and Derrick on the Roof

The number of men on the concrete gang varied from 13 to 15, according to the type of house and amount of concrete to be poured. At any one time there was at work five carpenter gangs erecting forms, two concrete gangs pouring, two stripping gangs stripping forms, one concrete gang on footings, pavings, porch floors, porch steps, etc., one digging gang and one finished carpentry gang doing the furring. roof framing, erecting door and window frames, sash doors, inside and outside trim, stair laying, floors, etc.

Concreting basement walls required about 2½ hours; pouring the floors about 1½ hours. Stripping and erecting the basement wall forms on the first story took 1½ to 2 days. The stripping of the first story walls and erecting the second story and cornice was a slower operation, and added from half a day to a day out of this. Concreting the walls took about 2½ hours and the roof about the same length of time. Universal Portland cement was used in the operation.

Big Increase in New York's Theater and Amusement Buildings

Some years ago it was thought that there were enough theatre buildings or places of amusement in New York City to meet growing requirements for some time to come, but the number is constantly increasing, and just at present there are more theaters under construction in the amusement center around Times Square than has been the case at any one time in the history of the city. Within the six blocks from Forty-second to Forty-eighth Street, immediately adjacent to Broadway, twelve new amusement houses have either been completed or are nearing completion for opening not later than early in 1918. They represent an investment of several million dollars and the property being improved is worth several millions more, as the locality

is one of the most valuable realty centers on Manhattan Island.

The most striking feature in connection with this unusual building activity is seen in the long-famous Forty-second Street theatrical block. With its nine big places of amusement—a record that has stood for years for a single block of any city in the world—there are three new large houses now under construction on the north side of the thoroughfare between Broadway and Eighth Avenue running through to Forty-third Street. By the coming spring, twelve large theaters will be contributing to the gayety of the town in that block. One of these new houses is below Forty-second Street.

Henry Miller's new theater in Forty-third Street is one of the noteworthy operations of the year. This is an attractive building of Colonial classic design with red brick front and neat white trim. The Shuberts have built four new houses this year in Forty-fourth and Forty-fifth Street, just west of Broadway, and their fifth house this year is about ready for use. They are making plans for their twenty-first theater, which will be on the southwest corner of Broadway and Forty-seventh Street. The construction work will be begun in the spring.

In the Forty-eighth Street theatrical block, between Sixth and Seventh Avenues, two small houses of attractive design are nearing completion. When finished this will give that block five theaters.

On Broadway, between Forty-ninth and Fiftieth Street, the largest theater of the year is about ready for occupancy. It will be used for the best type of moving-picture productions and have a seating capacity of 2300. According to the architect, W. Lamb, the cost will approximate $400,000. It is in the classic Grecian style with tall columns and sculptured figures over the corners, thus giving it very much the appearance of a Greek temple.

With the completion of all the new houses under way, there will be in the theater center from Thirty-eighth to Fiftieth Street, including the Hippodrome on Sixth Avenue, fifty-five houses of amusement, not counting the small moving picture places.

Repairing Cracks in Concrete Roofs

A correspondent writing to one of our London contemporaries describes the manner in which cracks in a reinforced concrete roof were repaired. As the subject is one of wide interest, we reprint the article herewith:

"A concrete roof, reinforced with 4-in. I-section iron joists, was made in a certain building. The span of the roof was 12 ft. and the joists were placed every 3 ft. apart. As sometimes happens in such roofs, the concrete had settled down on the lower flanges of the joists, thus forming a cavity along the entire length of the joists and on each side of them.

"The formation of these cavities weakened the overlying concrete, causing it to sag on both sides of the joists, with the result that a crack running the length of the joists appeared centrally over each joist. In rainy weather these cracks and cavities were able to store up water which gradually found its way into the building.

"To remedy these defects a 'trough,' 8½ in. by 1½ in., was cut out over each joist, so that the cracks then ran along the floors of the troughs. The sides of the troughs were slightly undercut. Next, the cracks themselves were cut so as to be 1 in. wide and to penetrate as far as the upper flanges of the joists. In order to reach the cavities a series of 'pour holes' were made from the floor of the trough, through the concrete to the cavities. The pour holes were made on both sides of the joists, but never opposite each other, and were a few feet apart.

"The whole surface was then carefully dusted and wetted, and a grout of 1 part cement, 1 part sand and 2½ per cent Pudlo was poured through each pour hole. Then a mixture of 2 parts of fine annealed slag, ½ part sand, 1 part cement and 3½ per cent Pudlo was used to complete the filling up of the cracks and cavities up to the level of the floor of the trench or trough. Having allowed this to consolidate, the trough was filled up with the same mixture, being reinforced with strips of expanded metal, No. 6.

"Another portion of the roof which had sagged very much in places was well hacked, treated in the above-mentioned manner, then given a Pudloed coat, 2½ in. thick, over the grouting."

Standardized Workmen's Houses in Great Britain

The urgent necessity for providing suitable housing accommodations for the working classes owing to the great scarcity which has arisen from war conditions, has caused the British government to consider the erection of more than 150,000 dwellings to meet the demands which may exist after the war has terminated. The prospective plans are to construct standardized houses with a slight variation of dimensions and style for different localities. Hygienic principles will be observed in construction of the houses and serious defects previously existing will be remedied.

In this connection it is interesting to note that the city of Bradford will require after the war at least 10,000 houses. In the city of Glasgow additional houses to the number of 46,700 are required at the present time, and it is stated that at least 5000 in each succeeding year will be necessary. The houses are to include among others what are known as tenements, each containing from eight to twelve small flats.

William Dreyer, one of the oldest and most highly respected citizens of De Funiak Springs, Fla., who recently died in that place, was an architect by profession and many of the more pretentious buildings of that city stand as monuments to his genius.

Built-in Features for the Modern Bath Room

By Charles Alma Byers

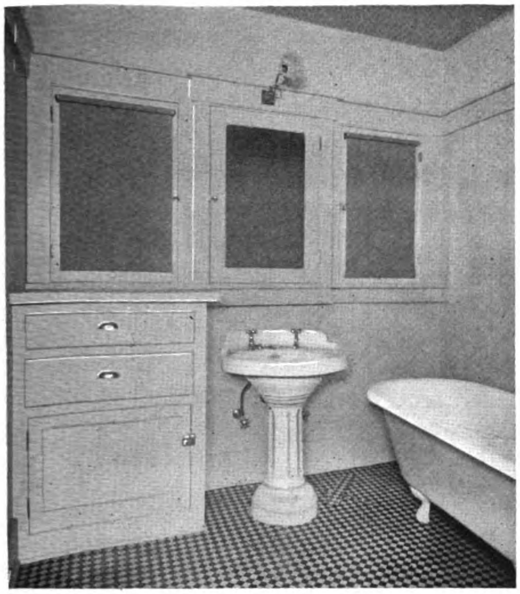


Fig. 1—Bath Room with Corner Cabinet Shown at the Left and Medicine Closet Between the Two Windows

WITH the demand from home builders for built-in features steadily on the increase, it is but natural that certain conveniences of this kind should have become popular for use in the bath room. When one considers the fact that this room is usually quite limited as to size, and that its furnishing, therefore, must be meager, it would seem that no other room of the home offers a better excuse for the introduction of such space-saving furniture.

Associated with the bath room must always be a quantity of linen, both clean and soiled, and some convenient place for storing it is naturally desirable. Then, too, there is the usual accumulation of medicine bottles, lotions and so forth, which must be provided for. A mirror is quite essential to the well-regulated bath room, and there, of course, must be a seat of some kind—both of which may as well be made stationary by building them in. Therefore, as being desirable built-in features of the well-planned bath room of limited size, there may be enumerated the following possibilities: A cabinet of shelves and drawers for clean linen, a bin for soiled clothing, a medicine chest, a wall mirror, and a seat. The seat may be of the box type, with a hinged top, if preferred, and in such case the soiled-linen bin can, perhaps, be dispensed with by using the receptacle beneath the seat to serve in its stead. The mirror may be set into some convenient area of the wall space, or into some door. Very frequently it is made a feature of the medicine chest by inserting it into the outer face of the door, and in other cases it is used to panel the full length of the main entrance door of the room, where a mirror of greater size is desired.

Referring to the accompanying illustrations, Fig. 1 shows a particularly simple arrangement of a bath room with a single corner cabinet and a wall medicine chest. A detailed drawing of these features is presented in Fig. 4 to enable the builder to carefully study them both as to design and

Fig. 2—Two Corner Cabinets with Box Seat Between

Fig. 3—An Arrangement for a Small Bath Room

Illustrating Some Examples of Built-In Features for the Modern Bath Room

dimensions. The corner cabinet occupies wall space 3 ft. 7 in. high by 2 ft. 10 in. wide, and projects into the room a distance of 20 in.—the last two dimensions being based upon top measurement. In the bottom are two shelves, each 16 in. deep, this portion of the fixture being provided with a wood panel door. In the top part are two drawers, the upper one being 4 in. in depth and the lower one 6 in. The top of the cabinet provides a very convenient counter-shelf, and above it is a casement window.

The medicine chest, located between the two casement windows of this end of the room, is provided with a door paneled with a beveled plate-glass mirror, and above it is a small wall lighting fixture. The size of this door is approximately 2 by 3 ft., and the cabinet contains four shelves, besides

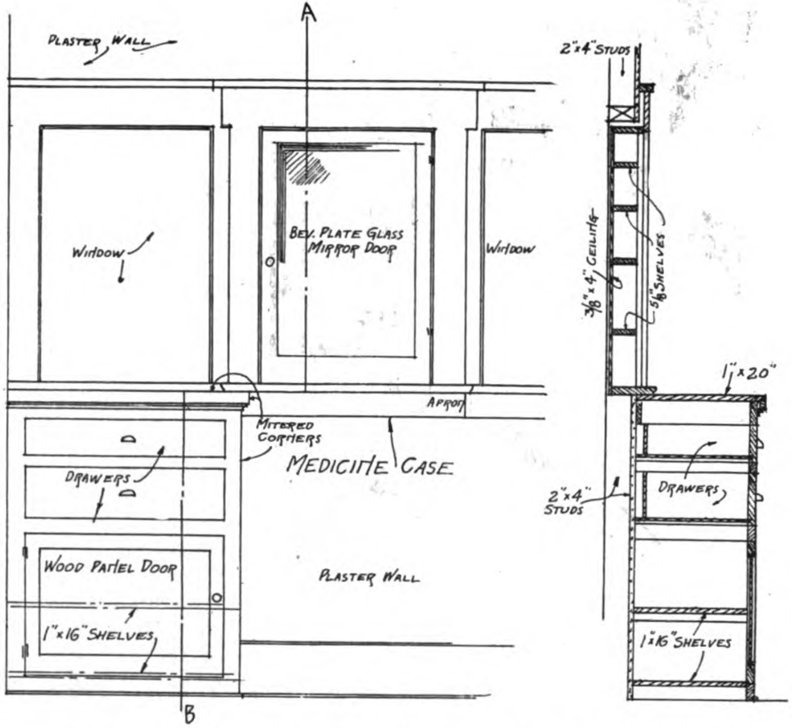


Fig. 4—Front Elevation and Vertical Section of a Linen Case—Scale ½ In. to the Foot

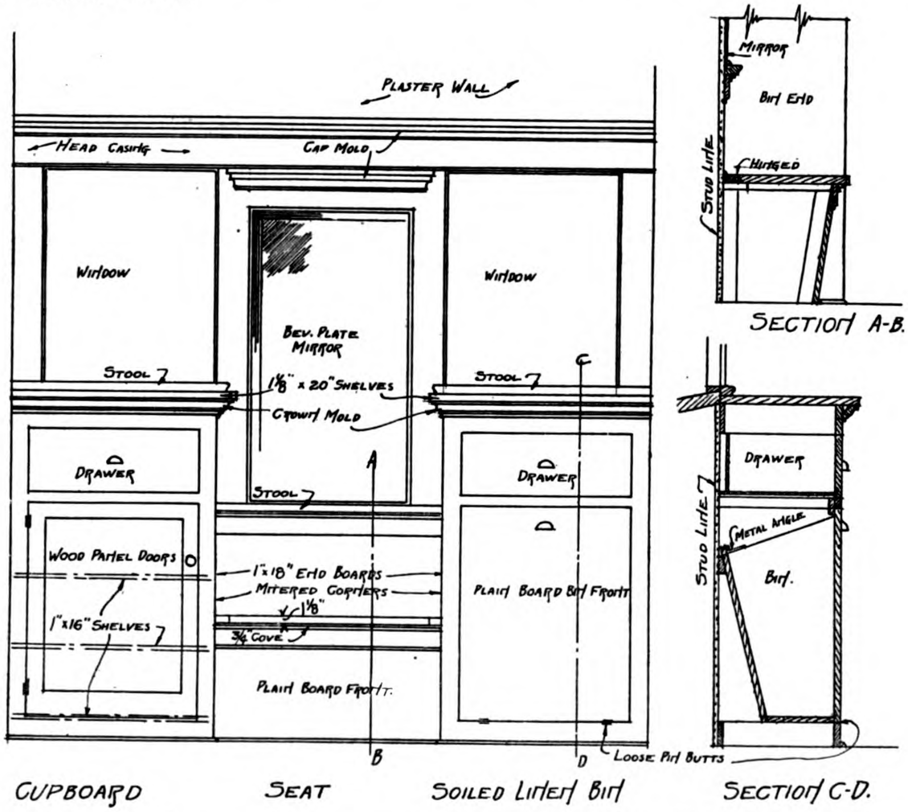


Fig. 5—Front Elevations of Bathroom Cupboard and Soiled Linen Bin with Vertical Sections—Scale ½ In. to the Foot

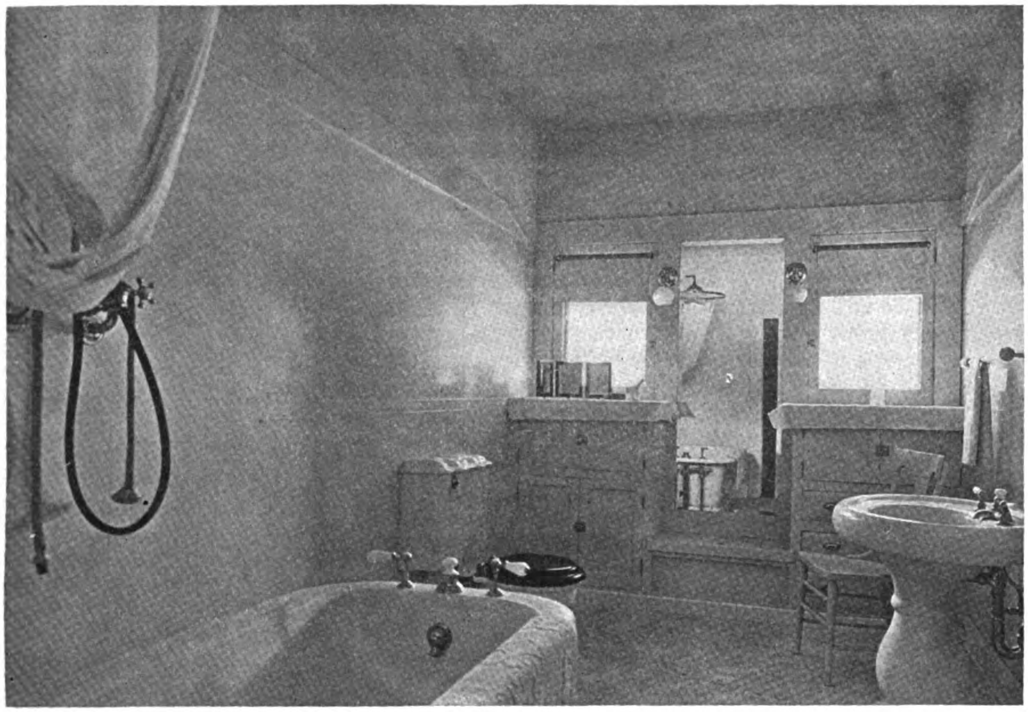
Some Built-In Features for the Modern Bath Room

the base, each 3 in deep. The cabinet, or chest, is recessed into the wall between studding.

This bath room is 8 by 9 ft. in dimensions, the built-in features occupying one of the end walls, and the ceiling height is 8 ft. 6 in. The flooring is of pine, covered with linoleum, and the walls, to the head casing which extends around the room on line with the top casing of the doors and windows, are surfaced, smooth, with hard wall plaster, marked off into tile-like blocks and enameled white—like the woodwork.

The next picture, Fig. 2, with its accompanying drawing of details Fig. 5, shows a more elaborate arrangement, consisting of two corner cabinets with in. deep. The top is hinged, and beneath is provided a most convenient storage place. Above the seat is a beveled plate-glass mirror, 1 ft. 10 in. wide by 3 ft. 5 in. long, and at each side of it is a wall lighting fixture. The medicine chest of this room is located in the other end wall, and is of the ordinary kind, its door being without the commonly used mirror.

This bath room is 7 ft. 6 in. wide by 9 ft. 6 in. in length. Its flooring is of tile, and the walls, as in the first described room, are of hard wall plaster, enameled white, like the woodwork. Its excellent equipment of built-in features makes it a truly delightful bath room in every way.



Built-In Features for the Bath Room. Fig. 6—A Well-Equipped Room with Shower and Various Cabinets Conveniently Disposed

a box seat between. The end of the room utilized for the features is 7 ft. 6 in. in width, and each of the corner cabinets is 4 ft. 1 in. high by 2 ft. 8 in. broad and 20 in. deep, these dimensions being based upon counter-shelf measurement. The cabinet to the left contains two 16-in. shelves and a drawer, and the one to the right a soiled-linen bin and a corresponding drawer. Each of the drawers is 8 in. in depth. The bin, as shown, is narrower at the bottom than at the top, and is so hinged at the bottom on loose pin butts that by drawing out on the top the mouth is opened to use, a stop on the back angle preventing it from dropping forward more than enough to bring the opening into view.

The box seat is 18 in. high and its top is 17

The picture, Fig. 3, shows another very attractive arrangement for a small bath room. Here again are two corner cabinets, and between the two small windows above them is a medicine chest, with a mirror-set door. In one of the cabinets are four drawers, and in the other are two shelves, concealed by a wood panel door. Each of these cabinets is also topped with a shallower section of cabinet space, provided with its individual door. The features are well grouped both as to convenience and economy of space, and as suggestions for designing such equipment they should prove interesting.

The picture designated as Fig. 6 shows a well-equipped bath room with various cabinets and full-length mirror between the windows, and is pre-

sented as being possibly of some suggestive value.

Built-in features of the kind here shown and described add but little to the construction cost of a house, and yet they will lend considerable to its general desirability. Usually the space utilized for them would be of little value in any other way, and every housewife will find this room much more easily taken care of if it contains such conveniences.

Restrictions on the Building of Small Houses*

In a good many of our cities burdensome restrictions are placed on the building of small houses by the cast iron regulations which we have to follow.

I do not question for a moment the wisdom of extending the zones in which fireproof construction is insisted upon, but in these cases some latitude should still be allowed in the choice of material. We should not be limited to the inevitable brick wall if local conditions make the building of a concrete wall or tile wall cheaper. Some cities still call for a 12-in. brick wall, whereas for the two-story house 8 in. is thick enough, and is passed by most cities. Building regulations have not yet discovered the possibilities of reinforced concrete, and if walls are built of concrete they also have to be 12 in. thick. A 6-in. concrete wall is perfectly satisfactory, and the houses we recently built at Donora have walls of the upper story 6 in. thick and cellars 9 in. thick. A concrete wall, of course, has to be furred and plastered on the inside just the same as a brick wall would have to be, in order to eliminate the condensation of moisture on days when the humidity is high.

Severe Restrictions Regarding Plumbing

Another point in which our building regulations in most of our cities are unduly severe is the matter of plumbing. Specifications usually call for extra heavy soil pipe, whereas standard weight is sufficient, and where two houses are built side by side with kitchens and bathrooms on either side of the party wall, one soil pipe and sewer connection for the houses would be an economy that would not in any way make the house or plumbing installation less sanitary. In building a row of houses it is usual to plan the bathroom and kitchen sink at the back of the house so that the soil pipes come at the back instead of the front, and in such case it would be much better to run a drain pipe just outside the back wall of the houses with one connection to the sewer at the end of the row and put separate sewer connections under the houses for each house.

Paving the Cellar

It is usual in building regulations to call for paving in a cellar. This is, although very desirable not a necessity on soil where there is good drainage through sand and gravel, even if the cellar is required.

The size of rooms is frequently restricted by building regulations which call for at least one room in the house to have an area exceeding anywhere from 120 to 150 sq. ft. and that no bedrooms will have a less area than 90 sq. ft. or a less width than 7 ft. Although in general these restrictions are desirable there are cases on awkward shaped lots where they work some hardships.

The loads prescribed for floor construction by building regulations are usually 40 to 50 lb. per square foot. Some cities run as high as 70 and even 100 lb. per square foot, which are most unreasonable. I do not think, however, that less than 50 lb. per square foot is a safe load to allow for because although the average load on a dwelling house is under 12 lb. per square foot, there is a possibility of much heavier concentrated loads sometimes being placed on the floor as in the case of an auction sale, funeral or wedding. It is usual to prescribe a factor of safety of 4 in the figuring of floor timbers. I do not believe that this should be changed because, although smaller floor joists would carry the load, they would not be rigid enough to bear a normal load without some sagging and cracking of plaster ceilings below.

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*Extracts from paper read before the National Housing Conference at Chicago by Leslie H. Allen of the Aberthaw Construction Co.

A New Ice-Skating Palace

A few years ago there was erected at a cost of about half a million dollars on the corner of Broadway and Ninety-fifth Street, New York City, a market building which was intended to relieve the food supply problem of the West Side. As time went by, it was seen that the problem was not likely to be satisfactorily solved and the building is now being made over into an ice-skating palace by Thomas Healy, the well-known restaurateur. He purchased the property as the site for a great hotel which he intended to erect at some time in the future, but until then it will be an amusement center for that section of the city.

The changes, which were designed by William H. Gompert, are such as will preserve the beauty of the building which was erected and decorated in the Italian Renaissance style. The alterations provide for ten stores in the Broadway front of the building and eleven offices above on what was the mezzanine floor in the old market building. The remainder of the floor area will be devoted to amusement purposes. The rink will be 100 ft. wide and 165 ft. long. The ceiling over the rink will be 22 ft. high. Around the ice will be a balcony with seats so arranged that the entire surface of the rink can be seen from every angle.

Two new greenhouses to cost $100,000 are to be erected for the botanical gardens in Bronx Park, New York City. They will be of steel, stone, brick and glass construction and one story in height. One will measure 172 ft. x 49.8 ft. and the other 106.6 ft. x 30.8 ft. The plans have been filed with the building department by the architects, Brinley & Holbrook.

"Kinks" From the Diary of a Carpenter

Suggestions Regarding Trade Matters Which the Practical Reader May Well Consider

By Hammer and Saw

OCCASIONALLY there is to be found a carpenter who has never seen a magazine devoted to his own particular trade, but just why this class of mechanics has not done so, several reasons might be cited, but I shall not try to enumerate them. On the other hand, a carpenter from whose appearance you would imagine he never read a trade paper, proves upon inquiry to have been a subscriber for years. It is one of the latter class whom I met in western Kansas two years ago.

The Shop Equipment

In addition to a general jobbing business, this man operated a nice little shop equipped with pony planer, jointer, combination saw and a mortiser with a 6-hp. gasoline engine to run the machine. On account of the scarcity of regular planing mills, these little shops are to be found in most towns all over the West.

The carpenter operating a shop of this kind is in a position to do, and does, handle a considerable portion of all the lumber bill for a complete job of almost any magnitude he would be liable to be called on to do in towns of from 1000 to 10,000 inhabitants.

I inquired of this carpenter if he took a certain trade paper and he replied, "Oh, yes."

"How do you like it?" I asked.

"Oh, well enough," he said, "but there are some funny things in it."

"How's that?" said I.

A Question of Stair Construction

"Well," said he, "in looking through a copy recently I saw an article and drawing of a housed string construction for a pair of stairs, and the author—I forgot his name—specified that the wedges be glued in front of the treads and risers. Now, did you ever see the wedges placed in front of the treads and risers?" said he.

"No," I confessed, "I had not not, but there must have been a mistake in print, and it would probably be rectified in the next issue, and a little mistake like that, I convinced him, was nothing compared to the many helpful plans and articles he had already secured from the magazine during the many years he had been a subscriber, and in this he agreed with me.

We spent a pleasant afternoon together in this little shop, discussing trade subjects, and it was with genuine regret we had to part. He allowed "he wasn't no hand to write much," but promised me he would send something to the editor covering an unusual piece of work he once did so that other readers might benefit from any possible suggestions the comments contained.

How Readers May Help the Editor

Now that the so-called dull season is at hand, why would it not be a good plan for all of us to send in to the editor of the paper a sketch or an article on some practical matter which has developed in our experience, say some project that looked hard to us and, in fact, was hard—a ticklish job; in fact, we thought could not be done but yet had to be done and was done in a superior manner. Let us tell the readers the way we did it. It will interest them. A brother carpenter in Iowa or Texas may be scratching his head over the same proposition we had. In fact, he may have a difficult job to do and a little information from us will help him do the work quicker and better. If we have a good thing—a trick of the trade—let us pass it along. Don't be like the farmer who became jealous and would not speak to his neighbor simply because the neighbor raised a few more bushels of oats than he did on the same acreage of ground.

Unsightly Joints in Barn Siding

Carpenters, when siding up a barn or shed with boards and battens, make a practice of butting the ends together on the plate, which, to my way of thinking, always caused a more or less unsightly joint. Of course, care can be taken and a reasonably close joint made by striking a chalk mark across the plate, but I have found that the better way when boarding from the ground to the plate is to saw the end on the plate at a bevel of about 25 deg. Saw the ends of the board for the gable at the regular 45-deg. miter and where they lap on

the plate will make a snug fit, and the job looks better than merely letting the ends of the gable boards run a few inches over the lower ones. Some workmen do this and then run a heavy molding across the gable ends to form a sort of belt-course and cover up the joint.

I have formed the habit of sawing boards at a slight bevel from the face when I want them to fit tightly, such as casings and base. To illustrate this, take. for example, the plancier of a box cornice. The rake portion of the board end where it joins the horizontal part is always sawed at a slight bevel in order to make a tight joint on the underside.

In nailing any joint for a tight fit, start by driving the nails slanting near the ends, which will draw the joints together. Running the saw through this joint once or twice will also help to make a tight fit. These are little details that can be acquired by experience, and it is the details of the work that one forgets, they are so numerous and continually changing, and yet they are very important.

Rough Framers and Finishers

There are two grades of workmen—the rough framers and finishers. Some men could never make good finishers but good rough framers, and for the young man it is best to learn all the rough work first and learn the finishing part gradually.

An old-timer, whose given name was Philander, they called him "Phy" for short, was a fine finisher and the boss used to give him particular jobs off by himself. When they were done, they were done right. The boys said he would work all day in a bushel measure, he was so precise in everything. I have seen him, in laying flooring, saw the ends over the joists at a slight bevel. In time, of course, the joints would open some, but there would be no perceptible crack clear through, as would be the case when sawed exactly square. "Phy," being of an exceedingly nervous temperament, would certainly call down the helper in the latest approved fashion if he neglected to keep those floor joints tight together when nailing.

What the Country Carpenter Must Know

The country carpenter must not only know his trade thoroughly, but lots of jobs out of his line which he is often called on to do, and in order to uphold his reputation, he must do them. The list is varied and includes such things as erecting elevators, smoke stacks, tinkering up furniture, splicing rope, doing all kinds of cabinet work. repairing farm machinery, leading the church choir, fiddling for barn dances at husking bees, etc. One fellow I knew who had a sort of curio shop used to repair furniture, tap shoes, act as village barber and sell cigars and soft drinks on the side. Another carpenter took charge and carried out the rest of funeral arrangements at one time when the regular undertaker was taken sick, just after he had embalmed the deceased.

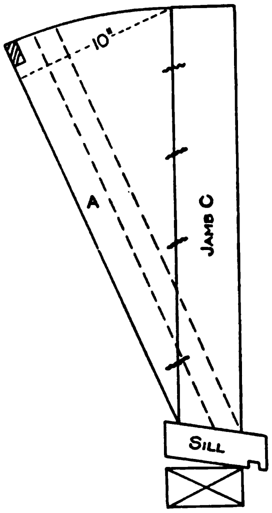
Carpenters Known as "Jack Legs"

This class of carpenters is called "jack legs," and are the recipients of much ridicule. However, they are geniuses in a way, and they are able to meet any emergency. I have heard smart Alecks allude to these old-timers and their methods of doing work as "has beens, slow and out-of-date," which, however, are not a decent man's sentiments at all. On account of changing conditions and age they are dropping out, as we all must in time, and as they slowly depart I do not know a more fitting tribute than the following lines:

> An honest day's work, a day's honest pay,
> Give their own thanks forever and aye.

It is the general practice in making doors and window sash to join the rails into the stiles, yet recently while doing some repair work in a house built in the sixties I noticed they were joined together directly the opposite of this, that is, the stiles were joined into the rails.

The accompanying sketch shows a cheaply made window frame suitable for stables in barns. At first glance it may look like a flour bin in a kitchen cabinet. However, in remodeling a barn last summer this style of frame was used in connection with common barn sash. They afford efficient ventilation at the top when open or they can be closed tight in cold weather.. The jamb *A* is securely fastened to the jamb *C* by means of crimped metals—dovetails—and the sash is hinged to the sill so as to swing inward. The sash is also held in position in the frame by means of push latches. The outside casing is lapped by the jambs ½ in. and acts as a stop.



A Window Frame for Stable with Ventilator at the Top

Why Italians Prefer Stone for Building

One of the reasons why natives of Italy in America prefer to build stone houses instead of the usual frame structures is that in Italy the most common material for building is stone, and the Italians are more familiar with this material than wood.

This is said to be the reason so many stone houses are to be seen in the Italian quarter of some of the cities of the country and often in isolated places. There are fewer carpenters than masons in Italy, which is also partly responsible for this condition.

Another interesting fact is that Italians, as a rule, are very careful about the foundation and exterior of their homes. No matter what grade of finish the interior may be the exterior is usually well done, special attention being given to the stonework and trimming.

CORRESPONDENCE

A Department Where Those Interested Can Discuss
Trade Topics—Every Reader is Invited to Participate

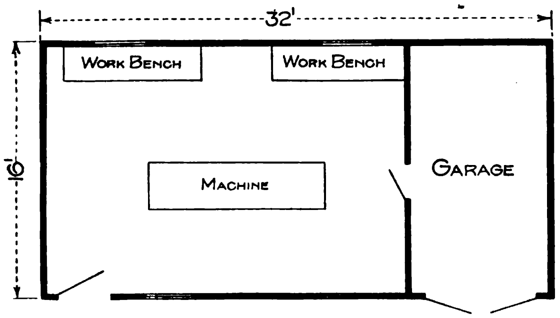
Chaplin Planes and Whitewashing Machines

From D. P. B., Redford, N. Y.—I have received an answer to both my queries in the December issue of the paper, it coming from a correspondent in Dayton, N. Y. I must acknowledge its receipt here as the correspondent wrote a good letter and apologized for it at the opening and closing, but unfortunately did not sign his name. He enclosed the drawing of a plane made like the English Razee plane. I have one of that type. The Chaplin is a fluted bottom iron plane with black rubber handle—the lightest plane of which I know. I like the old ones better than the new ones, but someone always begs mine from me though I have had several.

The correspondent also says that hand whitewashing machines of the small variety operated by suction by pushing a rod in the cylinder are all right for poultry houses or other small work. Aside from that they are not practicable. The style with a barrel and force pump operated by hand or by a small gasoline engine is the best. He states that farmers in his section use them a great deal. One person makes a business of whitewashing barns and spraying orchards. I want to spray my stables inside with Alabastine.

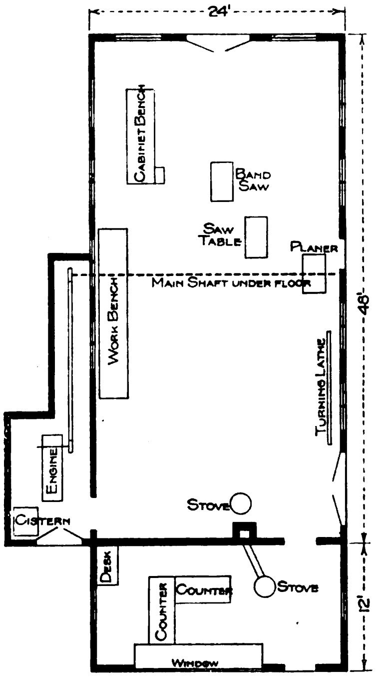
Shops of Two Contracting Builders

From S. H. K., Madisonville, Ohio.—I have just completed a new shop for getting out work in connection with my business as builder and contractor and it is possible that some of the readers of the BUILDING AGE may be interested in the arrangement of it. I would state at the outset that it is a small shop and therefore instead of having a great number of single machines, I have a Park's woodworker embodying rip and cut-off saw, band saw, jointer, shaper, swing saw, mortiser and borer, tenoner and sand disk. The machine is operated by a 5-hp. gasoline engine, which I regard as cheaper than electricity. I also have one made by the same concern consisting of a rip and cut-off saw with 4-hp. gasoline engine which I can use on the job.



Plan of Shop of "S. H. K."

I am sending a floor plan which shows the position of the machine, also of the work benches and the garage at the end of the shop.



Floor Plan of Shop of "F. W.," St. Charles, Minn.

From F. W., St. Charles, Minn.—I am sending a floor plan of the shop which I occupy and showing the position of the various machines and other equipment which may possibly prove of interest. I have a Crescent planer, a Fay & Egan band saw, a combination saw table which is home-made and also a wood lathe, also home-made. The motive power is a kerosene engine of 12 hp. and I find it very economical.

Information Wanted Regarding Pergola Construction

From F. J. S., Wellsburg, W. Va.—For some time past I have been a reader of the BUILDING AGE and have been greatly interested in the sketches and hints for builders which have been presented in its columns. I am planning to construct a pergola and would like some of the practical readers to furnish a sketch for the purpose. The pergola will be 50 x 20 ft., and as the surrounding buildings are of massive design it is intended to use large timbers, and about 12-in. columns set on 10-ft. centers, resting on concrete footings. Any information drawn from the experience of practical builders will be greatly appreciated.

Obtaining Cuts of Hip and Valley Rafters

From J. M. Bruce, Wanganui, New Zealand.—In answer to "W. W.," New York City, I have shown the way to obtain the width of the valley and hip rafters by the ordinary rules of projection. In most schemes of lines for roof that have come under my notice, the valley and hip are the lines of the intersection of the planes of the roof. If the valley and hips are backed, these will be quite correct. They certainly give the pitch of the members and the bevels are found correctly by them, but in practice the upper edge is left square and the sheeting miters up the center of the member.

In the case of the hip the edges of the hip intersect the planes of the roof in lines parallel to the intersection of the roof planes. I have exaggerated the thickness of the valley and hip and have drawn the plan of these and the horizontal trace of their backs.

In the valley, Fig. 1, the sheeting will miter on the line of the intersection of the roof planes. The plumb height, taken from the plumb height of the common rafter and the sides of the valley will be below the plane of the rafter backs by the amount of the plumb distance marked "X," and the jack rafters will have to stand that distance plumb above the edge of the valley. The underside of the over-valley part will have to be reduced as shown or the planceer lining and also the under edge of the valley itself will require to be kept up so that the edges will be of the same plane as the bottom of the rafters if the underside of the roof is lined as in an attic. I think this is clearly shown in the drawing.

In the hip, if the length of the intersection of the planes is taken as the length of the hip, it is found to be too long and the edges would be above the plane of the top of the rafter, and the thicker the hip the longer and higher it would be.

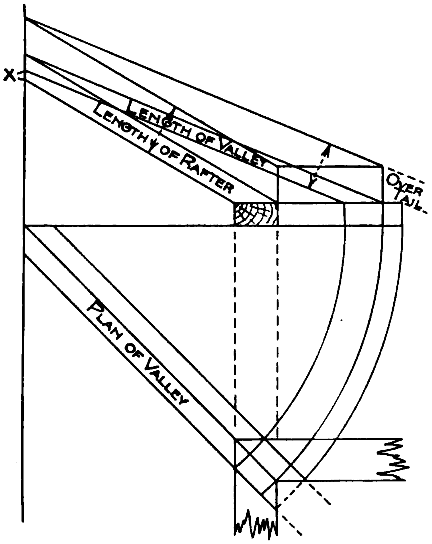


Fig. 1—Cuts for Valley Rafter

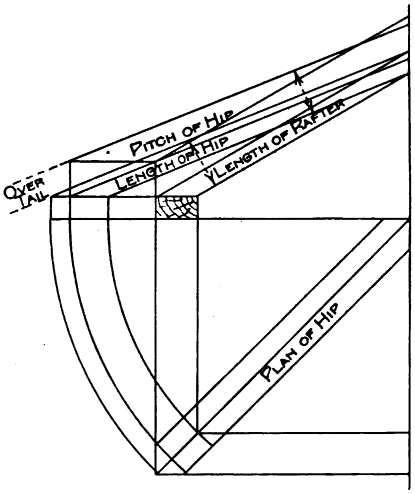


Fig. 2—Cuts for Hip Rafter

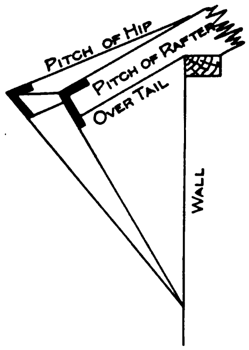


Fig. 3—Details of Tail Cuts

Mr. Bruce's Method of Obtaining Cuts for Hip and Valley Rafters

The diagram explains itself. The plumb height is taken from the plumb height of the common rafter and placed on the plumb line on the hip. The bottom edge of the hip may be found either from the bottom of the bevel of the rafter or as shown at the foot of the hip.

The width of the over-valley part is found as shown in Fig. 3, which indicates how to get the tail cut of the hip if the tail of the common rafter is cut square to the pitch. If the common rafter is cut plumb, of course the hip will also be cut plumb. If in any doubt in regard to these problems it is well to get at them by projection. You will notice as the roof in these examples is a roof of equal pitches on a rectangular plane, that the

hip is just half the thickness of the hip taken on the seat line shorter than the length of the intersection line and in the valley the underside is just the same distance longer than a parallel line through the corner.

I hope I have made myself clear and that I am not too late with this. The paper is nearly two months old when I get it, hence the tardy answer.

Supporting a Porch Roof of 28-ft. Span

From Hee H. See, Sacramento, Cal.—I am sending a few suggestions with the hope that they may be of use to "F. W.," Pittsfield, Mass., whose letter under the above heading appeared on page 636 of the November issue of this paper.

When there is plenty of headroom for the supporting truss, the problem is a comparatively simple one; but plenty of headroom is the exception rather than the rule, and "F. W." particularly says that he wants the truss as small as possible.

Fig. 1—Side and End Views of a Trussed Beam

Fig. 3—A Porch in which the Rod is Omitted from the Trussed Beam

Fig. 2—A Porch in which the Trussed Beam is Used

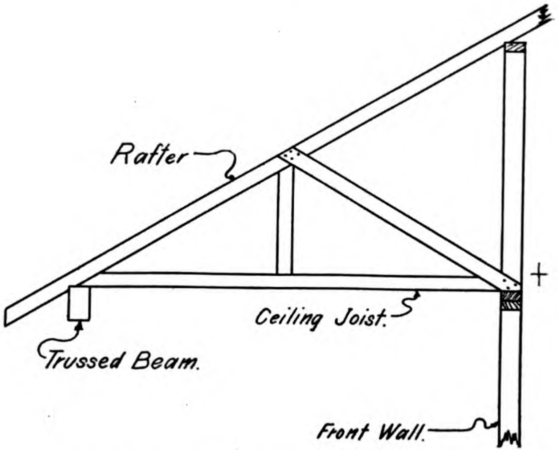


Fig. 4—Method of Framing Showing how a Beam May Be Relieved of Some of its Weight

Supporting a Porch Roof of 28-Ft. Span as Suggested by "Hee H. See"

In the opinion of the writer the best solution is a trussed beam, as shown in Fig. 1 of the sketches.

The sizes of the timbers and truss rods will vary according to conditions. In this part of the country, where we do not have to bother about a snow load, a trussed beam formed of two 3 x 12 in. Oregon pine planks and a 1-in. truss rod is sufficient for the span given. Fig. 2 shows this style of beam in place. On cheap work the truss rod is often omitted, with the result that the beam shows a sag a few months after it is up. A beam of this style is shown in the second photo, Fig. 3. The sag may not show in the reproduction, but it is quite noticeable in the original.

Where long material cannot be obtained, the beam may be built up of shorter lengths bolted together. In this case more material is required and two truss rods should be used, one on each side of the beam. Two truss rods are better than one in any case, because with two rods the beam has not the same tendency to buckle sideways.

The greater the depth of the beam—that is, the further from a horizontal line the truss rod can be placed—the stronger it is; so that if there is 18 in. of depth for the beam the center of the truss rod should be dropped below the 3 x 12's for that distance and the underside of the beam furred out to cover it.

Fig. 4 offers a suggestion of how the beam may be relieved of some of the weight. The front wall of the building is extended upward so as to support most of the weight of the rafter, and a brace running out as shown will carry some of the weight of the overhang and the porch ceiling.

Waterproofing a Cellar

From D. P. Barry, Redford, N. Y.—I am inclined to think that "A. L." of Gardner, Mass., has a bad job on his hands in its present form. It is difficult to give advice without knowing more of local conditions and the immediate topography of the ground. What he means by a head of 5 ft. of water is not clear. If he means he is 5 ft. below water level, then outside drainage is out of the question. If he means that the water is 5 ft. deep in the celler, that's another problem. If the cellar can be drained from the outside it would be the most effective and cheapest way out of a very bad situation. If it can be done, he could tunnel from the outside and put in three or four lines of tile, removing enough earth to allow the present floor to drop into place and then repair it.

My impression is that springs are not the direct cause his trouble. He may be on the outlet or inlet of a subterranean lake which is above him on both sides. The increased depth of the lake would produce extreme pressure at the lowest point, crowding the earth up at its least point of resistance, which is his cellar. The bursting and uprising of his floor may also be due to clay which heaves greatly when saturated with water and springs would certainly aid the phenomenon.

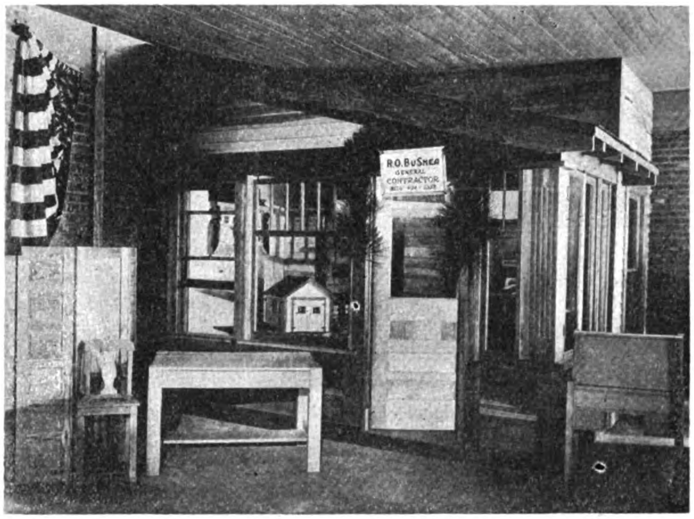
A case of that nature is found in a high level here. The cellar cannot be made waterproof because of the concrete breaking and a cistern in the cellar leaks after each repairing. I built a picket fence around this lot, putting the posts 5 ft. deep and filling in with ore sand. The fence heaves out. Anchoring the posts with wire and rocks does not hold them down. If there is but little water in the cellar of the correspondent, the trouble may be due to clay.

If the building and lot will warrant the expense, he has a few remedies. He may get hardwood timbers 38 ft. long, run them crosswise a foot under the walls and posts, then place hardwood 2 x 4's under the timbers 6 or 8 in. apart and bury the whole business in concrete containing 10 per cent of Maltha mixed with the cement and sand after wetting. Small and large I-beams may be used instead of timber if the cost can be met.

If I had the job to do I would smash the present floor to pieces, throw it out, excavate the cellar 5 or 6 ft. deep, in the center with a concave bottom running at least 7 in. under the walls and 2 ft. below the walls. If I struck mud I should go deeper. I would fill the hole with large and small stones, placing them in carefully so no large voids would be left, and then carefully fill under the brick walls. I would grout this with cement containing 10 per cent of hydrated lime, the mixture consisting of one part cement to five or six of sand. On top of this while still wet, I should put 8 in. of concrete containing 10 per cent each of hydrated lime and Maltha. That would hold "Ruprecht the Robber" down.

Advertising Scheme of a Contractor and Builder

From R. O. Bu Shea, Canton, Ohio.—I am sending a photograph of my exhibit at the Canton Community Exposition which was held the early part of October, thinking that it may be of interest to some of the readers of the Building Age.



Advertising Scheme of a Contractor and Builder in Canton, Ohio

As shown in the picture, the foreground is a porch section of a building with the different styles of windows for glassed-in porches. From the porch one enters a room with two windows and this room contains some work done in my shop, including a cypress Sugi finish bookcase. The walls were of Beaver board, tinted and panelled with oak strips.

In the foreground of the picture the reader will also see a library table of quarter-sawed oak, a child's chair, some panelled doors and a writing desk made in my shop.

I am a general contractor, always on the lookout for novel advertising stuff, and the above exhibit has been quite a profitable investment. It might be interesting if some of the other readers would tell about anything they may have done along the same lines in order to increase their business. These are times when everyone is on the *qui vive* for jobs of all kinds and if a discussion will bring out suggestions of value a good work will have been accomplished.

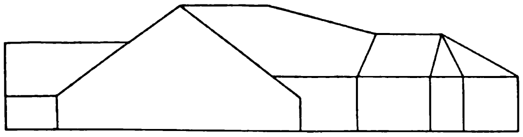
The leading contractors of Miami, Fla., have recently organized a Builders' Exchange.

Difficult Problem in Roof Framing

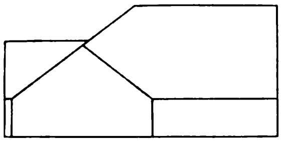
From C. J. M., St. Johns, Newfoundland.—I am sending blue prints showing my layout of the roof concerning which much discussion appeared in the Correspondence Department of the Building Age some months ago. It will be recalled that I presented for their attention a rather difficult problem in roof framing and the readers responded by giving various solutions showing the manner in which the work might be done. For the benefit of those who are curious to know how I did the work, in the first place, I would refer them to the diagrams here given. The drawings practically explain themselves and do not call for extended comment. As to the layout of the roof there is a chance here for some of those masters of the steel square to show how to obtain the cuts for the intersection of the different rafters.

Referring to the plan of the roof, I would say that in laying it out I found it necessary in order to bring ridge No. 2 the same height as ridge No. 1 and preserve the same pitch throughout, to raise the eave of the portion marked "X," 3 ft. 4½ in. above that of the portion marked "Y" instead of 3 ft., as described in the BUILDING AGE—in other words, to make the roof of which "O" is a portion, the same span at the lower eave as the gable marked "A."

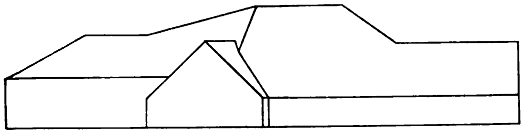
I shall be very much interested in learning what the practical readers may have to say in regard to the solution of the problem as here presented.



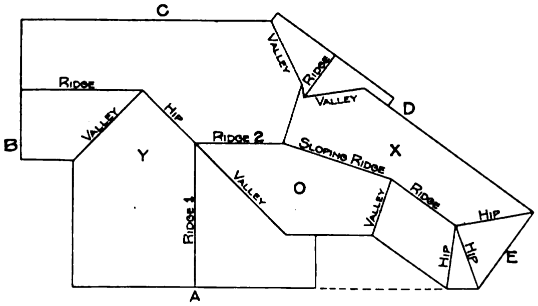
Elevation of the Side Marked "A" on the Plan



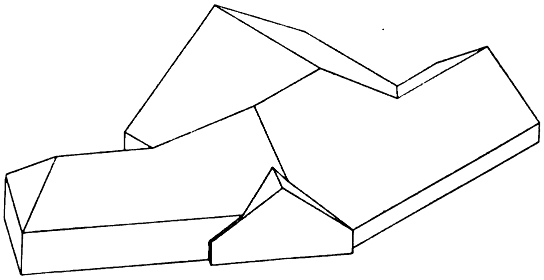
Elevation of End "B"



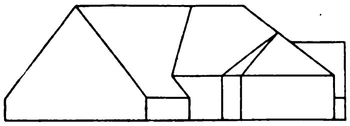
Elevation of Side "C"



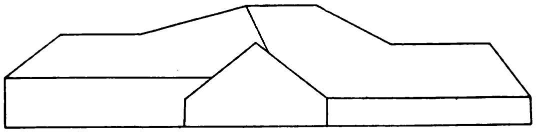
Plan of the Roof



Isometric Projection of the Roof



Elevation of End "E"



Elevation of Side "D"

A Difficult Problem in Roof Framing as Solved by "C. J. M.," of St. John's, Newfoundland

What Size Septic Tank Is Needed?

From M. F. L., Texas.—In connection with the plumbing in a large country residence it is necessary to provide a septic tank to care for the waste. The directions are to provide a concrete septic tank, but no sizes are given. The fixtures installed are 4 water closets, 2 bathtubs, 2 showers, 2 lavatories, 3 laundry tubs and 3 sinks.

How is discharge from septic tank best disposed of? Any information that the readers can give me will be greatly appreciated.

BUILDING AGE

FORMERLY CARPENTRY AND BUILDING
(Founded in 1879 by David Williams)

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Index to reading matter will be found on page 17 of the advertising section.

JANUARY, 1918

We take this occasion to express our appreciation of the co-operation shown by our practical readers during the year just brought to a close and to wish our patrons, one and all, a Prosperous and Happy 1918.

Index for 1917 Volume

Each year many of our readers bind the various issues of BUILDING AGE into a handsome volume for constant reference, and all such are likely to be interested in knowing that the index for the 1917 volume is now ready for distribution. Copies may be secured on application to this office.

Building in the Rural Districts

IF the future fulfills the promises of the present, some rural districts of this country will be transformed in appearance within the next year or two. That transformation will come about through the building of bigger and better farm homes, of bigger and better barns, and a tremendous increase in the number of bins, cribs, implement sheds, garages, hog houses, poultry houses and all various other forms of out buildings necessary to modern farming. The farmer, on the top wave of prosperity, is going to put his "war profits" into improvements on "the place," and those improvements will include whatever comforts and convenience he may have lacked in leaner years. Those who make a business of watching the trend of industrial activity say that while unprecedented prosperity is the principal reason for the widespread activity in rural building, that is not the only reason. They say the American farmer—and his wife and children as well—is just awakening to the realization that he need not deny himself the comforts and luxuries of city homes just because he lives on the farm, and now that he has the money coming in he is going to enjoy those advantages.

Increase in Buying Power

FURTHERMORE, the farmer is finding out that his buying power or the buying power of the commodities that he produces on the farm, is, in the purchase of many desirable things just about twice what it was a few years ago. He finds that especially true when he goes to buy building materials, and that is why he is preparing all over the country to equip his farm with modern structures, including the home. A load of corn or wheat, or a bale of cotton, or a fat steer or hog, will buy twice as much lumber as it would even four years ago, which naturally suggests that this is a fine time to trade farm products for building material. Since the European war began the price of lumber has advanced only about 28 per cent, the statisticians say, while the prices of ninety-six other important commodities, including farm products, have made an average advance of 127 per cent. Why lumber prices have not kept pace with prices of almost everything else is regarded as something of a mystery, but the fact remains they have not, and that is why the farmer is getting out his hammer and saw preparatory to "fixing up" before lumber prices begin to climb.

The Reconstruction Period

THERE is food for thought by builders and contractors, and a wealth of it, in the statements made by F. H. Sisson of the Guaranty Trust Co. in a recent address before the Buffalo Association of Credit Men. In discussing the reconstruction period he stated that "a billion dollars a year for five years will be needed for building purposes in the United States. The reconstruction of Europe, of course, will requisition far more capital. France alone is negotiating for an expenditure here in excess of $150,000,000 to rehabilitate her devastated cities. America, in fact, is the great reservoir from which all things must be drawn."

Twenty-fifth Anniversary of Cleveland Builders' Exchange

A notable assembly of Cleveland builders and their guests characterized the observance of the twenty-fifth anniversary of the Builders' Exchange of that city on the evening of Nov. 23. The exchange had as speaker Hon. William H. Taft, former President of the United States, who spoke on "America and the Great War."

Upward of 400 members and their ladies were present at a banquet held in the large ballroom of the Hollenden Hotel. The toastmaster was President Sam W. Emerson of the exchange. Among those at the speakers' table were ex-Governor and Ambassador to France Myron T. Herrick, Hon. Harry L. Davis, Mayor of Cleveland, and officers of the exchange. The banquet room was decorated with flags, and back of the speakers' table portraits of Washington, Lincoln and Wilson were displayed. Patriotic songs were sung, and the entire evening was in harmony with the spirit of the times.

Mr. Taft was introduced by William H. Hunt, former president of the exchange, and delivered a masterly address upholding the Government and outlining what he considered the necessary essentials for winning the war.

Following the banquet, a reception in honor of Mr. Taft was held in the parlors adjoining the ballroom, during which preparations were made for dancing, which ensued until after midnight.

The annual meeting of the exchange was held at the noon-hour and reports indicated the continued prosperity of the organization.

Fifty-five new members were added to the roster during the year and a substantial addition was made to the cash reserve fund.

New officers elected for the ensuing year were:

President—Sam W. Emerson.
Vice-President—C. W. Lundoff.
Treasurer—George Donley.
Secretary—Edward A. Roberts.
Assistant Secretary—Chas. D. Jamieson.

Registration of Architects

According to the second annual report of the Board of Examiners and Registration of Architects for New York State, there were 1991 applications received during the two years in which the law has been in force. Of this number 175 were withdrawn, 1367 were approved and 358 disapproved with the recommendation that they be not certified without examination.

In the report it is stated that "the Board of Examiners after two years' experience with the operation of the Registration Law and after examining the work of scores and hundreds of architects who are not a credit to their profession, is confirmed in its belief that the most important function of the Registration Law is its tendency to raise the standard of education and technical qualification." The board believes that "it has evidence of a strong impulse toward higher education on the part of young men ambitious to practise and with the assistance of architectural schools willing to co-operate with the Board, has confidence that the law will justify its beneficent purpose."

Exhibitors at Columbus Real Estate and Building Show

Many of our readers will doubtless be interested in a list of the exhibitors who at the time of going to press had contracted for space at the Real Estate and Building Show to be held at the State Fair Grounds, Columbus, Ohio, on January 21 to 30. It is expected that at least three of the largest buildings at the State Fair Grounds will be filled with exhibits, and indications at the present time are that a fourth building may be necessary. The list includes among others the following names:

The Southern Cypress Mfg. Association, New Orleans, La.
Gum Lumber Association, Memphis, Tenn.
Oak Flooring Mfg. Association, Cincinnati, Ohio.
Arkansas Soft Pine Bureau, Little Rock, Ark.
Seattle Lumber & Mfg. Association, Cleveland, Ohio.
Southern Pine Association, New Orleans, La.
Northern Hemlock & Hardware Assn., Detroit, Mich.
Toch Brothers, New York.
Northwestern Terra Cotta Co., Chicago, Ill.
Van Kannel Revolving Doors, New York.
Gillis & Geoghegan, New York.
Lowe Bros. Paint Co., Dayton, Ohio.
The Gas Appliance Co., Cleveland, Ohio.
Heppes-Nelson Roofing Co., Chicago, Ill.
General Fireproofing Co., Youngstown, Ohio.
Keasbey & Mattison Co., Ambler, Pa.
Kinnear Mfg. Co., Columbus, Ohio.
Acme Cement Plaster Co., Columbus, Ohio.
Ohio Hyd. Lime & Supply Co., Woodville, Ohio.
Columbus Clay Mfg. Co., Columbus, Ohio.
American Gypsum Co., Port Clinton, Ohio.
Island Sand & Gravel Co., Columbus, Ohio.
The Fertile Co., Cleveland, Ohio.
Stanley Works.
Acme White Lead & Color Works, Detroit, Mich.
Allith Prouty Co., Danville, Ill.
Koehring Machine Co., Milwaukee, Wis.
Woodworker Machine Co., Detroit, Mich.
Agricultural Lime Stone Association, Columbus, Ohio.
Flexstone Construction Co., Columbus, Ohio.
J. H. McLain Co., Columbus, Ohio.
H. W. Johns-Manville Co., New York.
Pittsburgh Water Heater Co., Pittsburgh, Pa.
R. L. Watson, Columbus, Ohio.
Marietta Paint & Color Co., Marietta, Ohio.
Sherwin-Williams Paint Co., Cleveland, Ohio.
Zinn & Robbins, Columbus, Ohio.
Electrical Contractors' Association, Columbus, Ohio.
C. A. Thomas Co., Columbus, Ohio.
Solar Metal Products Co., Columbus, Ohio.
Columbus Heating & Ventilating Co., Columbus, Ohio.
J. W. Coulson Co., Columbus, Ohio.
Thompson Heating Co., Columbus, Ohio.
Diamond Metal Strip Co., Columbus, Ohio.
W. F. Lamneck Heating & Vent. Co., Columbus, Ohio.
C. H. & E. Co., Columbus, Ohio.
Dalton Adding Machine Co., Cincinnati, Ohio.
Modern Ventilating Co., Cleveland, Ohio.
Bridgeport Wood Finishing Co., Bridgeport, Conn.
American Sewer Pipe Manufacturers' Association, Akron, Ohio.

Here is another war use of forest products. A planing mill company in Oregon has recently received an order for 1,000,000 tent pins from the United States Government. The pins are to be 24 in. long and will be made of maple and ash. Four months will be required to complete delivery.

Some Interesting Notes on the Manufacture of Wall Board

Features of Interest to the Building Contractor—Work Done at a Small Cost

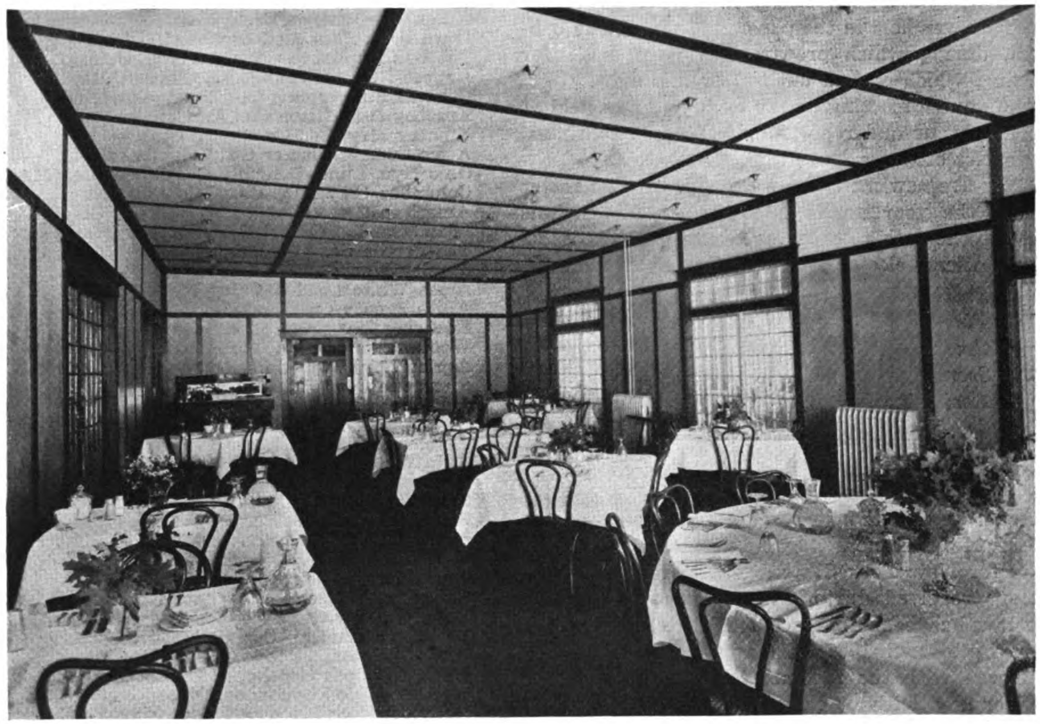
By Joseph A. Poesi

IT is not generally known that wall board was in use over a century ago. From history, however, we may learn that in the latter part of the eighteenth century manufactured panels of paper pulp were applied to interior walls and ceilings. But only comparatively recently has wall board come into popular favor for this purpose; therefore other wall finishing materials were too cheap to encourage its use.

Now hundreds and hundreds of millions of square feet of wall board find their way to the interiors of homes, commercial and other buildings where finished walls are required; and only recently the Government has put millions of feet of it in cantonment buildings for the comfort of our soldiers.

Clay's wall board was not called by that name, but was known as *papier-mache.* A great many other things besides wall board are made of this useful material. The name "wall board" originated only about ten years ago. It designated a certain built-up pulp board manufactured expressly for the treatment of walls and ceilings. Since that time, other kinds of boards for the same purpose have entered the wall board market, which have likewise assumed this appropriate appellation.

Then, too, as most of us are aware, wall board no longer confines its usefulness to the covering of walls and ceilings, but also to furniture making, cabinet making, shipping cases and kindred uses. Nevertheless, it never loses its identity as wall board thereby.

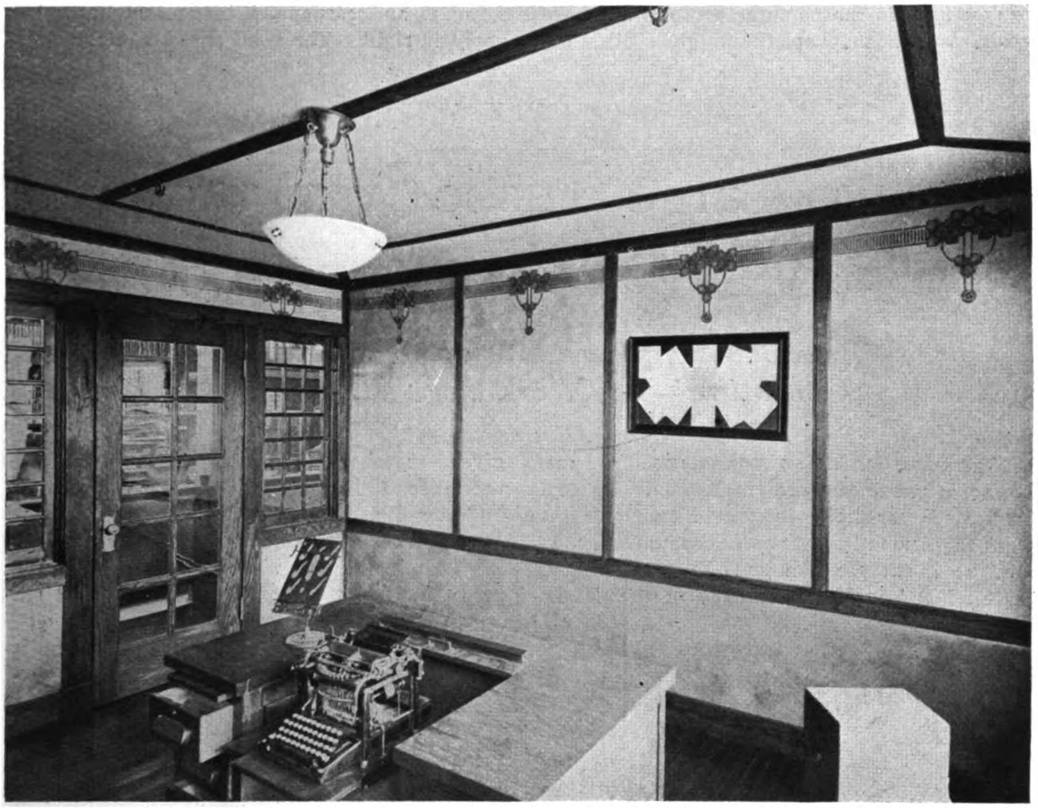


This Picture Shows a Public Dining-Room Having Walls and Ceiling of Wall Board

Wall board of Clay's time consisted of a number of sheets of specially made paper soaked in strong size of paste and glue, pasted together and pressed.

It was then dried in an oven, and later hardened by being dipped in oil. The finished board was exceedingly light, tough, strong and durable; elastic to some degree, little subject to warping or breaking, and unaffected by dampness.

Since that time many other methods and materials have been employed in the manufacture of wall board. Among the latter are included wood, rags, straw, waste paper, licorice root, jute, hemp, in fact anything that will produce strong fiber economically. With one known exception, all are first reduced to pulp and then made into board usually a quarter the thickness of the finished wall board. The process whereby this is brought about does not differ greatly from that of paper board.



Pleasant and Up-to-Date Offices Are Advantageously Treated with Wall Board

As a consequence, wall board has been divided into three classes according to the prescribed materials of which it is made. The first class takes in that made of rags, straw, licorice root, jute and hemp; the second, that made of wood in the form of either mechanical or chemical pulp, and waste newspaper; and the third, that made of glued-together wood lath faced on both sides with heavy paper.

In the first class are represented more brands than the others combined, although the second enjoys by far the greatest output. As to the third, only one brand apparently represents it, a brand that has been on the market for a long time.

Adhesives for holding the several plies of thin board together are numerous. Of these, silicate of soda is perhaps the most common. It is the same substance commonly known as water-glass. Other adhesives are a mixture of silicate of soda and powdered clay, flour paste, glue in many forms, asphalt and dextrin. Several others are probably in use. Each, however, has been selected by the various wall board makers with some particular advantage to be gained from it. They are considered highly important elements in the structure of wall board.

The matter of waterproofing has been of serious concern to the manufacturers of wall board during the last few years. They have been vying with one another in their efforts to bring out the most efficiently waterproofed board. All apparently realized that the future of the wall board industry depended upon their success in this direction; for, ever since wall board has been made by machinery—which, of course, precluded waterproofing it as Clay did—they have been bothered by its warping and shrinking on the wall due to atmospheric conditions.

For instance, if it was applied on a damp day to a wall directly from the bundle in which it had been delivered, it would immediately absorb moist-

ure from the air, expand and consequently warp. On the other hand, if the air had been very dry, such as is common in the West, the normal percentage of moisture in the board would quickly leave it, with the effect that it would shrink and likely draw away from the nails. Some means, therefore, had to be discovered or invented whereby wall board could be protected from the influence of atmospheric changes.

Various such means are now employed in connection with most brands of wall board. None, however, is exactly like another, though all consist of the principle of introducing oils or chemical waterproofing compounds into the board either at the early or in the late stage of manufacture.

Among the waterproofing agents that have been or are now used in the manufacture of wall board are rosin, turpentine, asphaltum, glue, oils, sulphate of iron, paraffin, wax and special compounds. Most of these are applied in the form of liquid by immersion.

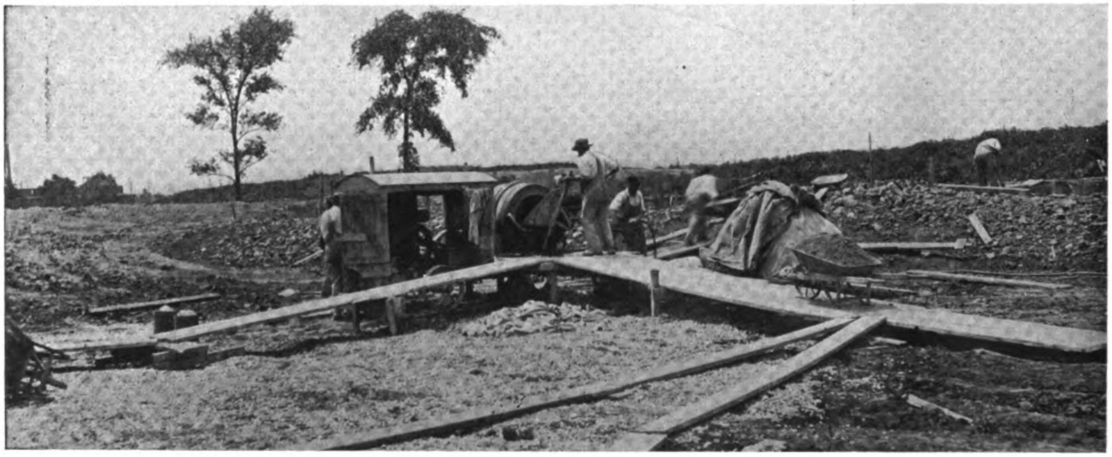
A number of makers of wall board are now even attempting to fireproof their boards, which is certainly a good indication of the progressiveness of the industry. While their work along this line is secretive, we can do no harm in mentioning that phosphate of soda has been for many years used to render paper somewhat immune from fire.

With the imperfections being gradually eliminated, wall board is bound to become as common as lath and plaster in the building field. Many builders have long recognized its peculiar adaptability for numerous purposes, and have recommended it to their clients. Architects are specifying it and carpenters in general know how to apply it right. The road ahead is clear.

How Two Large Rustic Swimming Pools of Concrete Were Constructed

Features of Intense Interest to the Building Contractor—The Work Done at Small Cost

THE construction of swimming pools is something in which the present-day building contractor is especially interested owing to the fact that the demand for them is constantly growing, and he is therefore anxious to learn of jobs of this kind and to know as many of the details as possible. While the pools here described may be larger than the average contractor might be called upon to construct, yet the principles involved are the same, and the proportions of concrete given, together with other information, cannot, therefore, fail to appeal to those engaged in the building line. The two swimming pools which form the basis of this article are being constructed in Columbus Park, which consists of about 145 acres located in the extreme west central part of the city of Chicago. The pools are near the eastern side of the park and are of irregular circular design to meet the conditions of the location and give them a more natural appearance.



Early Stages of the Work Showing One of the Concrete Mixers Actively Engaged

The larger pool is designed for a water depth at one end of 3 ft., sloping to 4½ ft. at the other, has an area of 23,420 sq. ft., and is formed by arcs of 13 points of tangent. The smaller pool is designed for a water depth of 3 ft. at one side, sloping to 9 ft. at the other, has an area of 7280 sq. ft., and is designed from the arcs of 6 points of tangent. The entire floors and sidewalls of both pools are made of 1:3:5 concrete, except that the floors are faced with 1 in. of 1 to 1 concrete. The walls will be capped with natural rock flagging, which will be carried back to form ledges and diving platforms, and at the side of the smaller pool will be a rock ledge ravine through which water from an artificial spring will enter the pool.

The structural features of greatest interest are the expansion joints in floors and side-walls. The floors were laid in 30 ft. slabs extending across the pools with 5 ft. square marked joints, the slabs being laid alternately to provide for contraction. Between the slabs extending across the pools are 1 in. expansion joints and 2 in. expansion joints are carried entirely around the floors of the pools immediately adjoining the side-walls. These joints are packed with oakum to within 2 in. of the surface and the remaining space filled with tar. The sidewalls are 6 to 12 ft. high, with 16 in. tops, 3 ft. to 3 ft. 6 in. footings, have 1 in 10 in. batters, and are provided with slip expansion joints.

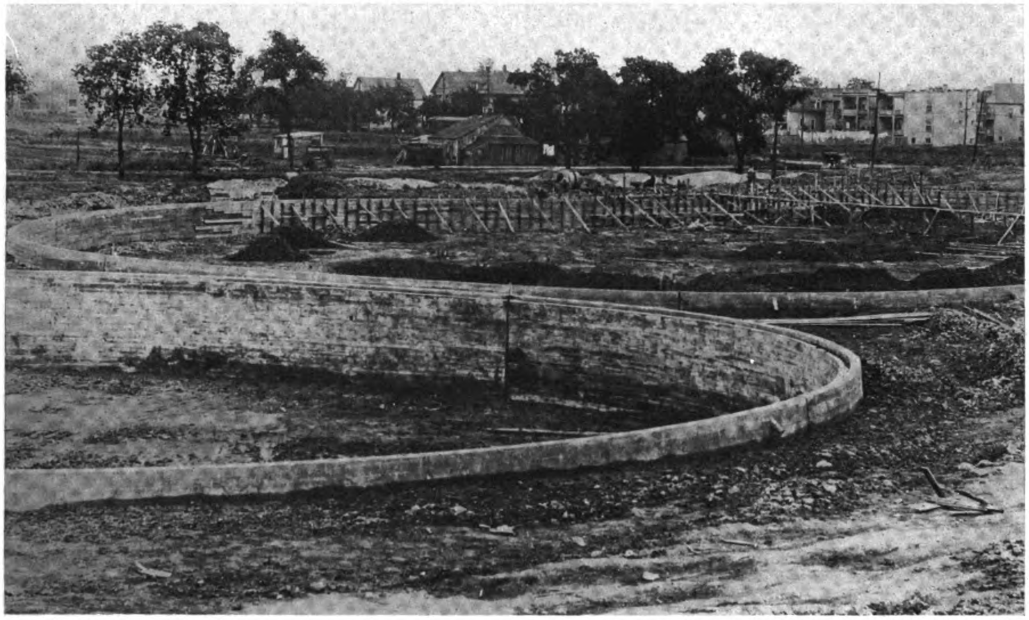
These joints provide for a 2 in. expansion and are spaced about 60 ft. apart in the walls. About 2 in. from the inner face of the walls in the expansion joints is a sheet of 16 oz. copper extending from the top to the bottom of the wall. This copper sheet is crimped in the center to provide for expansion and bent back at right angles at the sides to form anchorages in the walls. The overlapping concrete faces of the slip joints are separated by four-ply tar paper. These joints were made by using taper forms and pulling the forms after the concrete had set, but before it had become entirely dry.

At about 30 ft. distances around the top of the side-walls leading from a recessed inlet extending half the distance through the wall are 4 in. cast iron overflow pipes fitted with strainers. Each pool has a 6 in. water supply pipe and a 12 in. outlet drain. It is proposed to renew about 20 per cent of the water every night, and once each week the pools will be completely drained and the floors and side-walls scrubbed with an acid solution.

The contract for the excavation and concrete work of the two pools was awarded to J. J. Croake & Co., 2929 Fullerton Avenue, Chicago. Material for the concrete was delivered in motor trucks to the most convenient locations for rapid work surrounding the pools and all mixing was done in a ⅓-yd. "The Standard" low charging mixer, the portability of which permitted it to be quickly moved along as the work progressed, reducing the wheeling of material and concrete to the minimum.

This is the thirteenth park the West Chicago Park Commissioners have equipped with swimming pools, the design and construction of which have been under the direct supervision of A. C. Schrader, the chief engineer.

Plans for swimming pools in two other parks are now in preparation. During 1916 the pools of ten of these parks were in service and were patronized by 877,232 men and 375,075 women bathers.



A Partial View of the Two Concrete Swimming Pools During Process of Construction

Little Chats with Big Builders

Comments on Building Situation by a Well-Known Contractor Recently Elected President Ohio State Association Builders' Exchanges

AMONG the successful young builders of the United States who are giving a part of their time to organization work is Scott A. Porter, of Akron, Ohio, newly elected president of the Ohio State Association of Builders Exchanges. Mr. Porter is naturally adapted for leadership. He has a strong personality, and is a convincing talker, as well as an earnest and enthusiastic worker.

He received his early training from his father, James L. Porter, a well-known general contractor of Akron. Starting as a journeyman carpenter when sixteen years old, the son acquired the practical knowledge so essential to a building contractor if he would be master of his business. A partnership with his brothers, Herbert S. Porter and Warren J. Porter, was organized in 1907, under the name of Porter Brothers. This firm has taken some of the important work in Akron in recent years and has gained a reputation beyond the limits of that thriving city.

The offices of the company are located in the Second National Bank Building, the largest office structure in Akron.

SCOTT A. PORTER, a successful builder of Akron, Ohio, and recently elected president of the Ohio State Association of Builders' Exchanges

Speaking on the business of contracting, Mr. Porter recently said: "I believe it is a very important thing that contractors going from one city to another on contract work should observe the regulations of the city in which they operate. From my observation I am convinced that a great deal of trouble is created in the various cities by failure to observe this rule. Conditions in any city are usually carefully guarded by local contractors, and it is not right that so-called outside contractors should come in and upset them, causing disorganization and injury to the contracting business in general.

"I believe that the building industry of this country should receive greater consideration at the hands of the financial interests, and that there should be a more liberal attitude toward the making of loans for new operations. Of course, money is needed for the war, but we must not neglect the interests of our own industry and our own people, or how are we going to obtain the money with which to help the government in its national undertakings? To my mind there should be a standard form of constitution for the builders' exchanges of the country so that there will be greater uniformity in these organizations. Only local requirements need then be inserted by any specific organization.

"I also believe that there should be a national survey of the needs in the building industry so that the subject of wages and working rules could be equitably adjusted in all parts of the country without injustice being done to any particular locality.

"There are many things of interest to the industry which can be accomplished by our National and State Associations, and I hope that the work of these organizations will be earnestly supported by builders generally.

"The coming convention of the National Association of Builders' Exchanges, to be held in Pittsburgh in February, is of unusual importance to every contractor throughout the length and breadth of the land on account of existing conditions, and all of the Builders' Exchanges in the country should arrange to be represented at that time."

Construction of Malay Houses

Malay houses are invariably built on posts so as to raise the floor from 4 to 6 ft. above the ground. The floor is composed of bamboo, with interstices between the slats, the earth beneath becoming the receptacle of the drainage of the establishment. The universal plan of the well-to-do natives is to build the house in two divisions, the front one for receiving visitors and lounging generally, while the rear portion is reserved for the women and children.

BUILDING AGE

THE DEALER'S DEPARTMENT

The Value of Association Attendance

Best Methods of Securing Attendance of Dealers, Especially Those Owning Smaller Yards, at Association Meetings

BY C. E. DAVIDSON

THE Executive Committee of the National Lumber Manufacturers' Association, consisting of Messrs. Bigelow, Blodgett, Downman, Embree, Goodman, Hines, Keith, Paine and Sullivan, at a meeting held at Chicago, Nov. 15, passed a resolution directed to retail dealers urging the attendance of all dealers upon Association meetings, and, in short, aiding in the organization of the lumber industry at this special time, which they regard as very important.

I also have a letter from J. Moorhead, of the Southwestern Lumber Dealers' Association, of Kansas City, in which he says:

> "A few days ago I was talking with some members of our executive committee about the apathy of certain single-yard retailers toward the association, who seem to be harder to hold in association work than the larger line yard companies. One member remarked the reason was that conditions had changed so much for the better for the retailer, and so little really happened to the retailer to hurt him now, that he had come to the conclusion that the association was not worth anything to him."

We heartily agree that the dealer should be induced to attend these associations. There are, no doubt, several reasons, but the chief one, as I see it, is that the interest of the retailer is not, for some reason, held by the association. My idea is that the state associations have grown so large that the individual is, unintentionally, neglected.

A subject of vital importance to the lumber dealer is here discussed, for it is well known that the success or failure of any trade organization depends largely upon the attendance of its members and the practical interest which they manifest in its affairs.

The single yard man is sadly needed in the State associations, and he could probably be induced to join if he could be persuaded to attend the district association meetings, for it is usually found that the lumberman who attends his local association meetings is the one who attends the state association gatherings.

The association should have the interests of the dealer at heart, but this is seldom the case, and is one of the reasons why he fails to attend the meetings in greater number.

The National Association should set to work to organize each State association on the line of the bankers' organizations and probably more tangible results would follow in the way of attendance at meetings.

The question is open for discussion, and no one need hesitate to speak his mind and speak it freely.

I have always been an advocate of the sectional and district meetings. If the National Association would set to work to organize each state association on the line of the bankers' organizations, the result would no doubt be great. The bankers have their state organizations, and each state organization provides for district meetings and in a very general way provides the program and subjects needed to be discussed. The districts are organized, or at least the boundaries of each assigned by the state association, no doubt on the line of railway facilities to a large extent. Banks are "grouped," as it were, and the entire organization works like it was oiled, I am told.

I once took up this subject with Geo. W. Jones, secretary of our state association, and he told me he thought the idea a good one, but was not sure that the extra expense would be sanctioned by his executive committee. There are several sub-organizations in this state which act independently of the state association, which I have attended, and it appears to me the attendance is very good, considering the membership numbers.

At present our state associations meet once a year. The secretary makes his reports and does all he can to entertain us, and then we all go home with the idea of letting "George (Jones) do it." I am glad to say, too, he does it very creditably, but if he were authorized to have a good office assistant, and if he were assigned the privilege of supervising these district meetings, at regular stated intervals, much good could be accomplished.

Again, the idea should be abandoned of letting and expecting the local lumberman of the town in which we meet, pay all expenses of halls and entertainment. We should rent a hall, and pay all our

own expenses, and meet on a distinct business basis. If the bankers' plan is profitable, why would not such a one be equally advantageous for the lumbermen?

The Lumberman Wants His Money's Worth

Here we are again met with the old languor and indifference which characterizes the lumbermen in organized efforts. The fault is not with the lumbermen, because lumbermen are members of other local organizations, and in many instances help run all civic matters in their respective towns.

It has been advanced that such a system would cause a less attendance upon state meetings. I don't think so. I have observed that the lumberman who attends his local association is generally the one who attends the state meetings.

The lumberman is not stingy, but he likes to get his "money's worth." I was impressed several years ago by an incident which I will relate. I had attended our state meeting at Chicago, and was coming home. I met a fellow lumberman in the smoking compartment of the Pullman. He said he had rather enjoyed the meeting, but remarked that the trip and his membership in the association cost him $50 per year. He was a highly intelligent gentleman, fairly well fixed financially; had what is called a small yard with about a $15,000 stock. He was one of those men who watched expenses, kept a note book in which he jotted down his expenses. He took out this book and ran over his expenses of the trip.

Keeping Account of Expenses

Most of us would rather not keep an account of such expenses. There is not one man in a hundred who will keep the expenses of the operating cost of his automobile, or those of a hunting trip, or of any "outing" trip, because, perhaps, he doesn't want to feel it has been expensive, who does not at the same time religiously keep every item of expense of his business. I became interested and found that my friend's expenses ran about as follows:

Car fare to and from Chicago	$10.00
Pullman, both ways	4.00
Porter	.50
Room, three days, in Chicago ($3 per day)	9.00
Meals, with tips, $1.25 each ($3.75 each day)	11.25
Show, two nights, $2.50	5.00
Membership in Association	10.00
Incidentals	2.25
	$52.00

He naturally was contemplating whether he "got his money's worth," because he was a very practical sort of man. We argued he was entitled to the outing, to which he assented. Then there was the general good the association does. We couldn't do without them.

The Single Yard Man Needed

Yet, I am in doubt whether he attended the next state meeting. His pride would not have permitted him to admit these things to his association officer.

Mr. Moorhead refers to the single yard man. We need him worst of all. There is very little trouble in getting the line yard companies to maintain a living price for his lumber, but the single yard man, living in the village with his limited trade, with light expenses, is tempted to poach on his neighbor and to cut prices. I know from experience that membership in an association, and association with other lumbermen, does more than anything else to stop these bad practices.

How He Could Be Induced to Join

I believe these single yard men could be induced to join the district association, or join the state association, if he could attend the district association, which perhaps was held close to him, and he would not be at much expense in attending the meeting. In his home town he doesn't tip any one. Doesn't pay $1.25 for his meals, but goes to a ten-cent show instead of one which costs $2.50.

The extravagances of the big city are best illustrated by the Chicago man, who lived a year in the "loop" hotels. It cost him thirty cents each day to tip the "blond with the golden curls" for checking his hat, or $9 per month, or a total of $108 for checking a $4 hat. Of course the "bloods" who take a bracer before breakfast don't mind these things, but the "single yard man" does.

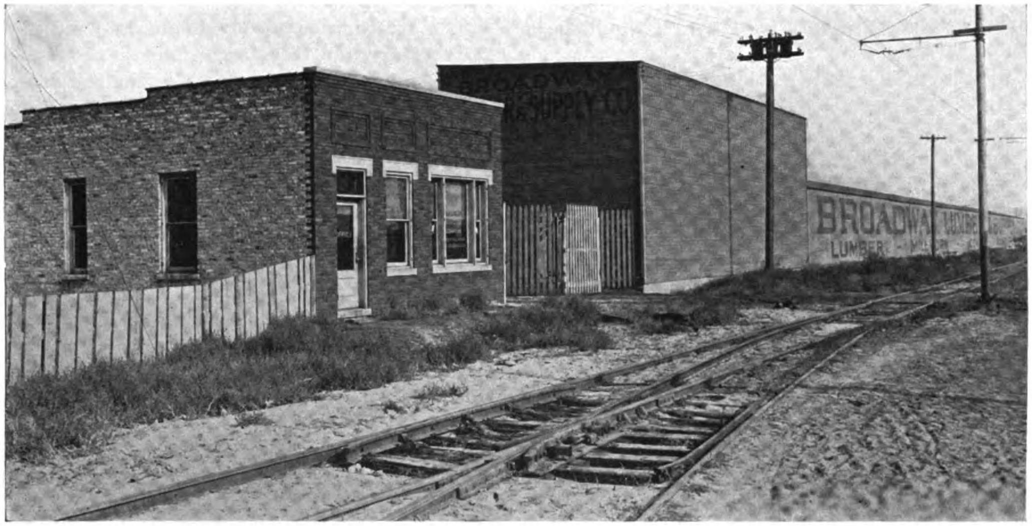
The Secretary to Look After Things

I dare say many yardmen who belong to associations and pay their dues, but who do not attend the meetings, think that the secretary of the association will look after matters for him—and he does, too, to a large extent. These dealers do not fully realize that it is their presence at association meetings which pleases the executives of the associations.

One remedy would be to hold the state meetings occasionally in different parts of the state, and thus attract dealers to attend who had never attended a meeting. If they go once they will likely go again, but this is not always advisable, as the state associations are large and must seek some large hotel in which to meet. I believe the bankers' plan to be a good one and one we should follow—at least the matter is worthy of the consideration of the National Association.

Lumbermen Ask New Method of Payment

The Federal Trade Commission held a conference a few days ago with fifteen lumbermen from New York, New Jersey and Maryland, who are supplying hundreds of millions of board feet of lumber to the government for cantonment and ship construction. Retail costs, particularly handling charges, were discussed. The lumbermen have requested the Trade Commission, which is furnishing information on which government contracts are made, to aid them in obtaining a change from present methods of payment.



View Showing Office at the Left and Front Exterior of the Plant, with Railroad Tracks at the Right

A Modern Lumber Yard of the Hoosier State

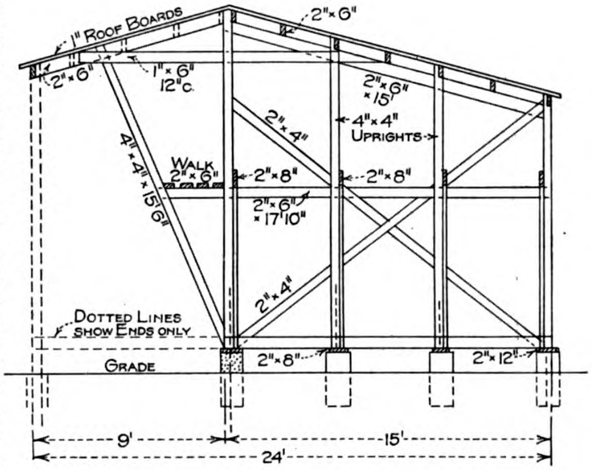
Storage Bins for Various Classes of Materials, Together with the Warehouse, Office, Etc., Are Features

THE State of Indiana may, or may not, rank first in its number of real up-to-date lumber yards, but it would certainly be worth while for dealers in any number of the cities and towns of other states to pay a visit to some of the model yards among Indiana's progressive lumbermen and the opportunity of a visit to Gary should not be overlooked, for that thriving city can truthfully

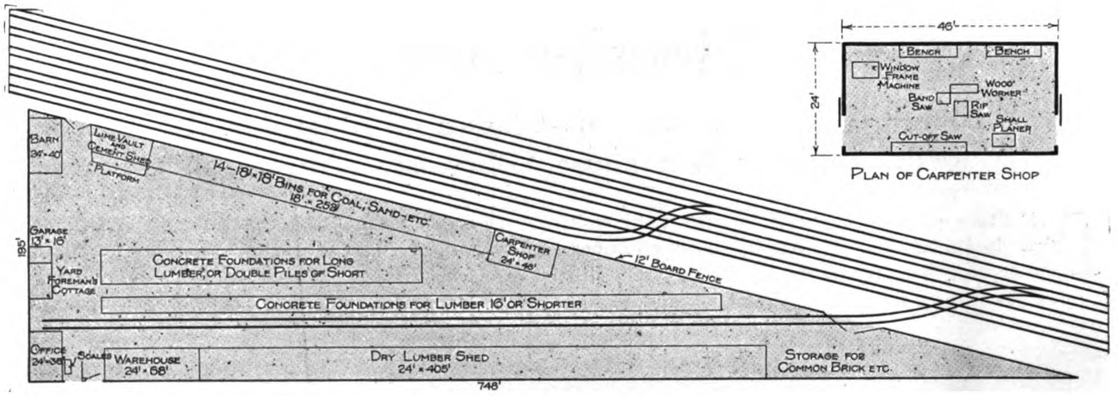
The Delivery Equipment of the Lumber Company, with Its Teamsters Ready for Duty

boast of five yards, any one of which would be a credit to any community.

A great majoriy of the lumber and building material yards have been planned and started in a small way, as cheaply constructed as possible and then if the business grew beyond expectations they have been enlarged accordingly, but not as efficiently as though they had been built to take care of a larger volume in the first place. Many yards added to and partly reconstructed to keep apace with increased business present the appearance and really are nothing but patched up propositions. Not so with the last yard built by Harry W. Richter of Laporte and M. L. Kline of Hammond, Ind. These gentlemen have been associated together in the lumber business in their respective small cities for a number of years and before entering this their latest venture thoroughly investigated the conditions peculiar to Gary, Ind., and decided there was ample room for another lumber and building material yard that was capable of taking care of a good-sized volume of business.

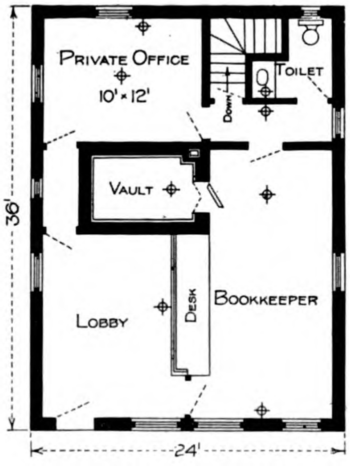


Vertical Section Through One of the Lumber Sheds



Plan of Carpenter Shop

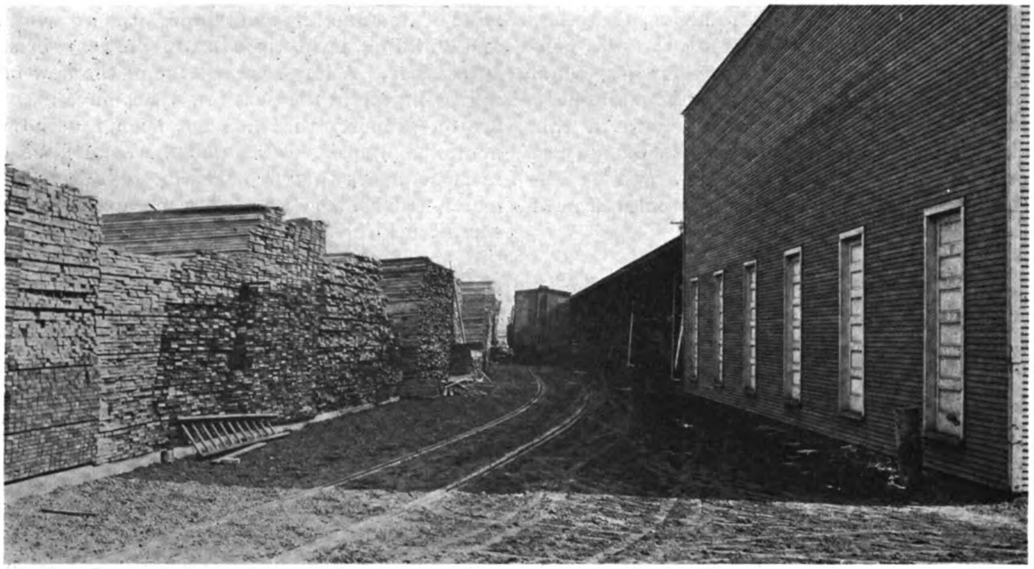
Plan of Yard, Showing Position of the Various Buildings as Well as Railroad Tracks



Plan of Office

The result is the model yard of the Broadway Lumber & Supply Company of Gary, Ind., with Harry W. Richter as president, and M. L. Kline as secretary and treasurer. This yard was opened for business on Nov. 6, 1916, under the competent management of Vernon R. Lehmann, who had previously been associated with Mr. Kline in the Hammond yard. That this venture has been a marked success is demonstrated by the fact that, although just one year old and a new company, they have furnished the lumber and building material for upwards of 325 buildings, business blocks, etc., in addition to repair-job material and their coal trade, which is as large as they are able to take care of, due to the limited supply that all dealers are enabled to obtain from the mines.

This yard is centrally located on a narrow triangular strip of ground just east of Broadway—Gary's principal thoroughfare—and along the main lines of the Michigan Central Railway, so that switching facilities are unequalled. One branch of the railroad switch runs parallel through the yard so that all finished lumber, sash, doors, moldings and other perishable material can be unloaded from the car directly into the sheds and warehouses, while the rough lumber

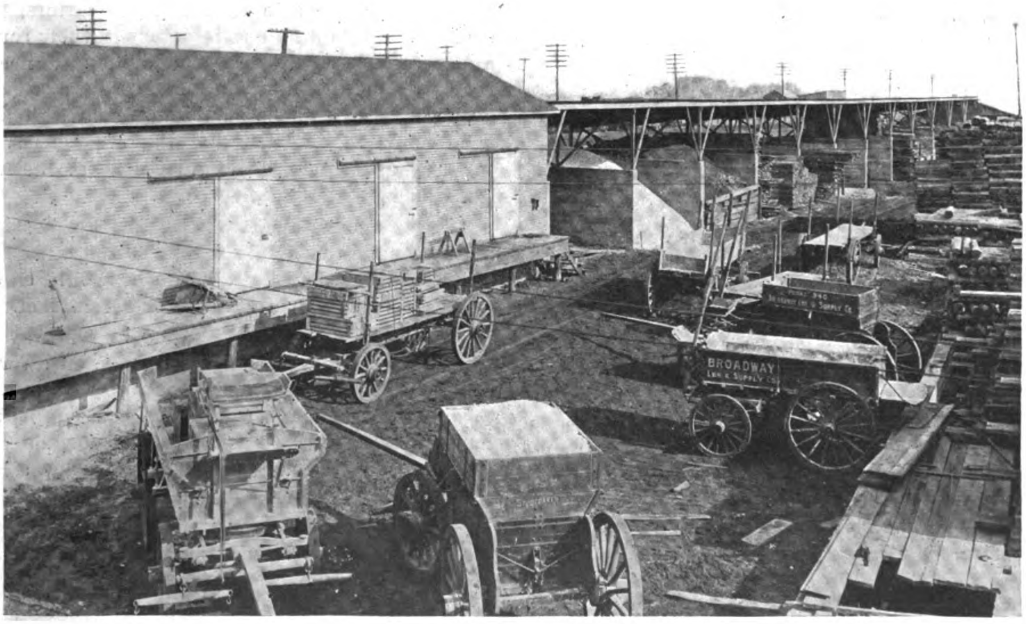


The Sash, Door and Molding Warehouse, with Dry Lumber Sheds at the Right and Rough Lumber Piles at the Left

can be unloaded onto concrete foundations without cartage. Another switch runs along the edge of the yard directly in the rear of the coal bins and miscellaneous building material warehouses, so that all classes of material reach their proper storage at a minimum of handling expense.

Storage for sash, doors and moldings is excellently taken care of by the construction of a dust-proof warehouse, which although small, is amply large for a yard of this size. For three carloads of molding and finish, 1000 doors and 1500 windows can be conveniently taken care of. Smaller moldings are stood on end in separate racks for convenience in sorting different lengths, and racks are also built for casing and base so that each length and kind is separate and piled flat to prevent warping. Partitions and racks are also arranged for sash and doors so that each size and kind is by itself and plainly marked.

This warehouse is as near dust-proof as possible to build, although the construction is very simple. High-grade matched sheathing was used and heavy building paper applied before the tongue and grooved siding was put on. The heavy pan-



Warehouse and Bins for Miscellaneous Building Materials, Coal, etc.. with Delivery Trucks in the Foreground

eled doors are placed in the frames so that they are opened by sliding up and hung to stiles containing pockets and weights. The frames, while much heavier, are made very similar to a slip-head window frame. There are no windows in this building, but illumination is obtained by the use of rows of electric lights, each row wired separately so that only the compartment entered need be illuminated at any one time.

Warehouse for Various Materials

At the west end of the coal and building material bins, a warehouse is built for the storage of cement, plaster, building paper and prepared roofing. In one end of this warehouse an air-tight lime vault is installed. Concrete floors are a feature of these warehouses and storage bins.

The Storage of Rough Lumber

Rough lumber storage is neatly taken care of by the construction of long parallel rows of concrete foundations, on which all lumber is piled so that there will be no shrinkage of stocks by the lower layers of piles rotting. It is estimated that these foundations will accommodate from 2,000,000 to 2,500,000 ft. of stock. Besides running parallel with the switching track provision is made for ample wagon road on either side of these foundations and tracks so that all rough and finished lumber is not only expeditiously unloaded but very easy of access.

The Carpenter Shop

A small carpenter shop and odd-work mill is located at the end of the building material sheds and contains the machines and equipment necessary to turn out common window and door frames, odd sash and miscellaneous mill work. The machinery is conveniently located for the expeditious handling of material and consists of a woodworker, small planer, rip, band and cutoff saws, and a window frame machine. An individual electric motor is a part of each machine and city current is used.

Cottage for Yard Foreman

A neat little cottage is constructed at one end of the yard in the rear of the office, which is turned over as living quarters for the yard foreman. This serves the purpose of keeping a trusted employee right on the job at all times to take care of any emergency that might arise, besides eliminating the expense of a night watchman.

The plan and photograph of the office, published herewith, demonstrate that it is most conveniently located and arranged, besides being most attractive and like every other department of the yard is planned and constructed so that the company will be able to most efficiently serve their customers.

Conditions Bad for Motor Trucks

Due to the rapidly increasing manufacturing interests of this northern Indiana city, and in spite of its annoying sand dunes, it is growing fast and building must necessarily be very brisk to keep apace. A large percentage of the new buildings going up in the past few years have been and are on property that has not been favored with municipal improvements and the sand is so deep in most places that it makes it prohibitive to use motor trucks, so that with the exception of a small truck for quick delivery on the paved streets this yard uses teams exclusively. However, they claim to have the finest horses in Gary, as shown by the $2,500 worth of horse flesh seen in an accompanying photograph.

Gary need not be ashamed of any of its five yards, but it can be justly proud to mention The Broadway Lumber & Supply Company as one of them.

One Method of Increasing the Silo Business

The following appeared in a late issue of one of the New York daily papers:

"Here is a roundabout but effective way in which we built up a special list of farmer prospects," said a representative of a silo company. "We planned to conduct an intensive campaign in certain limited territory, trying to secure an up-to-date list of farmers ready to consider buying a silo.

"Our first step," continued the silo man, "was to advertise by direct mail alone in order to get the desired mailing list. We wrote to newspapers and banks, asking them to supply us with the names of men in their localities operating creameries. The banks, which are just now taking an unwonted interest in agricultural matters, were especially prompt and satisfactory in their replies, and the newspapers accommodated us almost as much in detail, though more tardily. Next in order, we wrote to the men whose names thus had been supplied as operating the creameries. In turn, we asked them to give us a list of the farmers who had at least five cows.

"The creamery owners were, for the most part, willing enough to help, for they fully realized that after a farmer had built a silo he would be likely to keep on producing milk for the market.

"The mailing list we obtained in this way was supplemented by calls from active, well-informed salesmen. We kept the list up to the moment, through occasionally sending a postage-paid return card whereon we asked the farmer addressed to state how many horses and cows he was keeping.

"If he held a sale and reduced his stock below the point that indicated the need for a silo, we dropped his name from the list.

"We found this plan much more satisfactory than other more direct plans and less trouble was experienced in keeping the list up to date."

What the Evolution of the Building Material Business Has Wrought

The Plan-Book System and How It Has Affected the Building Contractor

By "The Old Retailer"

THE tendency of things in modern business economy is to eliminate the unnecessary, and the process is now going on in the business vorld of trying to find out what is necessary and 'hat is not, and also of adjusting itself to the ıanges resulting therefrom. The evolution of the uilding material business and ıe developments which have ome into it during recent years e of such a character as will ventually reduce the import-ce of the contractor in the uilding business in so far as pertains to work of smaller nstruction. In the larger nstructive work he has al-ys been an important fac- and probably always will tinue to be, but even in this s of work unionized labor shorn him of much of his ner power and prerogative. ever this may be in the er cities he still continues n important agent in the ing industry. To a con-able extent also he has the same in the large s and farming communi- generally. In some places as assumed an importance of all proportion to his and in consequence he e lumber dealer have not d together as they should eir mutual interests.

IN discussing some of the things the evolution of the building material business has brought about the author points out the tendency toward a lessened importance of the building contractor so far as concerns smaller construction work although in some places he has assumed an importance out of all proportion to his value, with consequent friction with the local lumber dealer.

The country contractor, he says, is likely to be reduced to the position of working foreman on the job.

Another feature is the plan-book system whereby lumber dealers operating large yards sell buildings complete for a fixed sum, this including the plans, specifications, and the necessary materials.

This, however, is likely to be more attractive in the rural districts and farming communities than in the larger cities and towns.

The purport of the article is that conditions developing in the trade are calculated to bring about a needed improvement in the quality of contractors.

e are certain things de-g in the retail lumber s in the country which s though they were likely to render less neces- the country contractor than he now is. In these things progress to their logical result, bid fair to do, he will be reduced to the of the working foreman on a job, and in verage town contractor will doubtless make if not more money than he did at con-

the last five or six years there has been in the consciousness of the progressive berman a realization of the necessity for improvement in his methods of selling building material and adopting new policies generally along this line. The plan-book system was first introduced by a lumberman's association and primarily designed for the use of the membership. It proved so successful that the scope of its benefits was enlarged permitting the use of it by any dealer in the country who was willing to adopt it and make the necessary small investment. It was not long before private companies were formed with a system of plans and selling them as their own. These, too, have had a phenomenal success. Along with sources of plan distribution have come some of the trade papers and the popular magazines who are giving their readers the benefit of some of the best architectural knowledge and skill in the community.

This extensive publicity of building plans is educating and creating a desire in the public mind for more beauty and convenience of living in dwelling houses. The old box style of houses in the country towns and on the farms is giving place to the more modern form of beauty and arrangement of interior. The man of moderate means is now able to obtain the services of the best architects and designers of modern homes without having to go to the expense of employing a professional architect to draw his plans and specifications and superintending the job. For less than the sum of $10 he can secure all these and have a competent foreman, also the men to erect and complete the building and in this way acting as his contractor.

This movement of change from the old methods has as yet only begun, and, of course, the number of people availing themselves of these privileges are comparatively few, but there is no doubt of their increasing, for it's the logical outcome of this home plan publicity and its education for better homes.

The greatest impetus being given to this movement is by the large line yard concerns and those of the progressive retailers who have had the vision to see that it was a legitimate development of the retailing of building material. These larger concerns, however, instead of buying a plan book system have organized plan book service departments for their own yard systems and employ their own architects and estimators. One such company has fifteen or twenty of these employed all the time, and in the rush season they sometimes have as many as thirty so great is the extent to which this service has grown.

Selling Buildings Complete for a Fixed Sum

The success of this kind of service has led to a further development. Drawing the plans and specifications and furnishing these with estimates of their cost to their customers was but the prelude to adopting the idea of selling the building complete for a certain fixed sum. Some of these large companies are now doing this and have their yard managers trained to handle sales of this character on this basis instead of by the old way of selling bills to the lowest bidder, for, as you may know, lumber is the only commodity that is bought by the unit, sold for a lump sum and in the case of bills, practionally auctioned off to the lowest bidder.

The Scheme Does Not Include Labor

By way of explanation I want to say that selling of houses and barns complete does not include the mechanical work and other labor—simply the furnishing of all the materials of whatever kind that goes into the building. This leaves the owner the choice of letting out the whole work by contract or having it done by the day under his own supervision and that of the lumber dealer who is furnishing the plans.

Now, it seems a logical proposition to believe that this selling of a building complete, as I have explained, will go still further and eventually will include all the work for the erection of the building and turning the keys over to the owner when the building is completed after the manner of a regular contractor.

A Coming Development of the Business

In my judgment, this is one of the coming developments of the retail lumber business. It is not wholly a new thing, either. Here and there, for many years, dealers could be found who had added contracting as a part of their business, but as a general proposition lumber dealers have not taken kindly to the idea, and, besides, most of them were ignorant of the primary principles and rules of construction. They were in the business to sell the material only, and not to have anything to do with putting it together in a building. But this introduction of the furnishing of plans has demonstrated that in order to intelligently explain them and be of assistance to the customer in his understanding them, the dealer must have a working knowledge of them himself. If he advertises himself to the community as headquarters for building information he must make good in this or his plan-book service will be but an indifferent success.

The Ready-Cut Building Concerns

It is a question, of course, how far this development will materialize in the retail lumber business regarding the contracting for the whole building complete with the labor included. I apprehend that it might prove more practicable in a farming community than in the larger towns and cities. It is going to depend somewhat on the extension of the business of the ready-cut building concerns whose competition has undoubtedly created the necessity for the retail lumberman to counteract it on the same line of effort. It would be unwise for lumber dealers to shut their eyes to the fact of these concerns doing a large business that is increasing every year. They were the first to see that the consumer thought more of the building as it would cost completed than he did of the cost of the materials going into it.

The Advantage Is with the Dealer

The average man knows as little about building materials as he does of the cloth in his suit of clothes. He never thinks of asking the tailor the cost per yard of the material. What he desires to know is the cost of the whole suit ready to wear, and it's the same with the man who wants a new house, barn or any other building, and so recognizing this as the fundamental desire of those going to build, the business has been started for furnishing people with what they want in a complete house for a certain fixed sum. But as the ready-cut concerns include only the materials in the buildings they sell, the retail lumbermen would have a decided advantage over them should they adopt the proposition of contracting for the whole job. I am of the opinion, however, that this will not be generally resorted to unless the competition becomes too strong.

Dealer In Direct Contact

But there is little question about the general adoption by the country lumber dealers of the idea of furnishing the plans and selling the building, leaving the owner to contract for the work as it best suits him. This will bring the dealer into direct relations with the owner and relieve him of charging the sales of the building material to the contractor and thus materially affect the present relations between them for the contractor would have little occasion to buy material except for repair jobs and small buildings. This, too, would practically eliminate the small and the incompetent contractor from the business of contracting to furnish for the larger jobs, which probably is one of the incentives to encourage the inducement for dealers to adopt the new system, for as every dealer knows by experience, this class of contractors is a detriment to the obtaining of legitimate profits.

One can only speculate on how this is going to affect the action of those contractors who are able and competent to take contracts for jobs, furnishing materials and labor and complete them satis-

factorily, and as for financial backing such men are able usually to get all that is necessary providing their character standard will warrant it. It is not wise to assume that this class of contractors will put up with such a loss of their business as the taking up of contracting by lumber dealers would entail. Many of them have substantial shop buildings fitted up with more or less machinery for economizing labor in their work, and, therefore, it is only natural they should endeavor to preserve their contracting business and in doing this secure a plan-book system of their own and enter into direct competition with the lumber dealers in the business of selling the completed building. There is not much difficulty in their being able to purchase materials at the wholesale price, and his understanding the building business so much better than the average lumber dealer will make him a formidable competitor in that line of work.

In cases where this is put into effect it is a question whether the dealer will gain anything in his adopting the new system. Elimination in this case might prove to be the creator of a worse condition than the one it tries to supplant, for it will introduce a new competitor for the selling of material in every place where action of this kind is carried into effect, and what the dealer might gain in one way he would probably lose in another.

One thing is certainly sure, however, it would bring about a needed improvement in the quality of contractors. There is too much quantity nowadays in the business of contracting to make it worth while for a really capable and honest contractor, and if the working of the new system would eliminate the small fry, the incompetent and undesirable element in the contracting business, it would give the desirable contractor a better chance for success because he would be competing only with a responsible competitor—the lumber dealer.

In order to get business contractors must be progressive and the same can be said of the retail lumber dealers. People are not going to the non-progressive contractor for the construction of their houses when they can obtain the services of a trained architect and the facilities of a large line yard system which will furnish all materials and do the work, turning the building over complete for a specified sum which the prospective owners know will be the limit of cost.

As the system develops and the policy proves successful the lumber yard will find it good policy to engage a competent carpenter as part of the yard force for doing odd jobs and repair work.

"Old Retailer" does not believe the policy of selling the building will be generally adopted by individual dealers although there may be some to take it up. The great majority will continue to sell buildings through the agency of the contractor because the other method involves possession of a working knowledge of architecture and few among the older men are likely to bother with that.

Looking at this matter of selling the building from all sides in a practical way, I do not apprehend that it will be very generally adopted by individual dealers. There will be some among them, of course, who will take it up, because they have the ability and the will to study and learn what is necessary and courage to carry it into action, but the great majority of individual dealers for some time to come will continue to sell buildings through the agency of the contractor, for the reason that the selling of building material in the form of a complete building involves possession of a working knowledge of architecture, and few among the older men are going to bother with this sort of thing. Then, again, the relations with contractors is a local matter with all dealers, and wherever they are fairly agreeable and satisfactory there will be little disposition on the part of the dealer to want to disturb them.

There is a probability, however, that the larger of the line yard concerns will go on developing the new system, irrespective of the relations with contractors. Their business ability and the employment of large capital gives them an advantage which the average individual yard owner does not possess. Again, their scale of operations covers mostly the smaller towns in the country districts, which gives them, in a way, a practical control of the selling of building material in these localities, and therefore, if they see fit to introduce a new improvement in their selling methods they can do so without regarding competitors. Consequently in these small places the carpenter-contractor will have to forgo his profit on furnishing material for a job and content himself with contracting for the carpenter work, as the case may be. The yard manager will have a training in the knowledge of building construction as good if not better than he has, and will, therefore, take his place as the authority on building information.

As a rule, contractors in these small towns are not much inclined to be progressive. They are willing to follow along in the old styles and methods of building, and, left to themselves, would continue on in the same ways of doing, and with this disposition it cannot be otherwise than that the march of modern improvement will push him aside. It is not to be reasonably supposed that people will go to this class of contractor to contract for the building of a house when they can have the privilege of obtaining the services of a trained architect and contracting with such a responsible concern as a great line yard system, who will furnish the plans and materials for a conscientiously arranged and modern style of home, and all for a specified sum that they know will be the limit of expenditure.

Undoubtedly as this new selling policy proves successful the lumber yard will employ a good carpenter as part of the yard force for the purpose of doing repair work and such odd jobs as people may want

done. Such an extension of service by the lumberman would no doubt be appreciated and made use of, as it leaves the owner to deal with but the one party and does away with the necessity of running around buying materials and having the different mechanics to do the work, and looking after the job generally.

I wouldn't wonder if such will be the logical outcome of this new selling service in the smaller country towns. It will not lessen the amount of mechanical labor to be done in those places. It will simply shift the contracting into better trained and more responsible hands, and will be better both for the community and the tradesman doing the work. Progress is no respector of established usages. The complex and inefficient methods must give way to those more simple and direct in their efficiency.

The Cash System Is Coming

BY A DEALER

It is likely that the lumber mills will adopt the new terms of sale, or at least a modification of them. It will be some terms by which the mills will get their money at once, or its equivalent—an acceptance drawing interest.

Unfair to Pay for "Things Uunseen"

While I think it manifestly unfair to compel a man to pay for something he has never seen and humbly trust to the honor and uprightness of the service to be rendered, yet it does appear that even if we paid for the car as soon as received and unloaded this would approximate a "cash-in-advance system."

This, it appears, is coming, and the quicker retailers recognize it and "put their house in order" the less grief will they have later.

Mill Can Insist on Cash Transaction

The situation is this: The mill and the retailer are personally strangers and the mill can insist upon a cash transaction, and it appears fair, yet I dare say that the mill manager who insists upon such rigid rules would quit his tailor in a huff if the tailor demanded of him cash before his new suit was thoroughly tried on and perfectly fitted. Or if his grocer should deny him credit for 30 or 60 days there would be more trouble.

The Human Equation

It is the human equation. The retailer's neighbor starts a new residence. It is to cost $5,000. He lets a contract drawn by an architect which provides that the building will not be paid for until it is erected and finished. Nothing wrong about that. It is the sensible thing to do.

Another friend of the retailer—and all his customers are more or less in the category of personal friends—erects a big barn, and, of course, he would feel somewhat hurt if money were demanded before the building was erected or at least until it was well under way. Then there are the hundreds of small orders which go on the books, and custom has been established that it is not paid, cannot be paid, until it is all delivered, and the return lumber credited back.

When the Lumberman Gets His Pay

The cement contractor is building a hard road. Ninety-nine times out of a hundred he owns nothing but a good concrete mixer, a team or two, and perhaps enough ready cash to pay for his labor. The road will not be paid for until some county or State supervisor comes, and, in severe and lofty mien, accepts the work. Then a board meeting, perhaps, and the poor lumberman, if the contractor didn't lose any money, will get his pay. The retailer all the time is carrying the contractor's misfortunes, if there be any.

All these items soon run up into thousands. The sixty days' time usually allowed the retailer has been of inestimable benefit. It gives him a breathing spell.

The Cash System

But now he is confronted with a cash system. The thing for him to do is to adopt as near a cash system as circumstances will permit. He can no longer tell his farmer friend it will be all right for payment to be made, "when the hogs are sold," or "when he markets his wool," etc.

The plain facts are always the best. Let us simply tell our customers that stern and rigid rules of terms have been applied to us, and we must in turn pass them on down to the consumer. It can be accomplished with variations. In my article in a recent number of the BUILDING AGE, I wrote on "Financing a Lumber Yard." In that article I gave a form of a note which can be used. The retailer can say he must have cash within thirty days, or a note. The bank will take the note and thus relieve the retailer of his burden.

A Practice Successfully Followed

I have successfully followed this practice for years and have never offended any customer. With a smile you can tell the customer your terms are cash within thirty days or note. The note contains a judgment clause and another specifying its taking does not waive the mechanic's lien. The note should not give credit longer than ninety days, and never be renewed. No man ought to ask another to carry his debt longer on a purchase.

I have heard of a few yards which have the "cash-in-advance" system, but do not know with what success it was employed. A discount of one per cent for cash payment within ten days ought to aid.

More Rigid Terms of Sale

A more rigid "terms of sale" must be adopted by the retailers if the present proposed terms are put into effect. In the meantime, and particularly in war time, the retailer with his limited capital must set his rudder so he will "run close to shore." The usually accommodating banker may not, in these times, be able to always take care of him.

Impressions of a Building Age Traveler*

How a Dealer Made Capital Out of the Cash Feature of Mail Order Buying

WHEN a business ought to show about so much volume each month, and when its owner knows just what that volume should be, it would seem that even a slight falling off over a very short period of time would be enough to put a good business man on the alert hunting for the cause. When that falling off comes at a time of unusual prosperity it would seem to amount to a danger signal that any good business man would heed. But, as I have said, Willson was a real business man. He thought he knew all the "ins and outs" of his business, and he did—almost. I might say that he knew the "ins" thoroughly, but was a little hazy as to the "outs." That fairly describes the situation.

The "Theory" of Merchandising

The fact was that for some months before this slump occurred Willson had become very much absorbed in the *theory* of merchandising. He was becoming a student by force of sheer interest in the abstract problems of selling. But, as happens with many people who become involved in the web of theory, he was failing altogether to apply the theory to his business. When the bookkeeper turned him in a trial balance that was "in the red" it jarred him out of a very pleasant and somewhat self-satisfied frame of mind and shocked him into a realization that something was really wrong—something that he must get busy and remedy.

The first thing to be determined, of course, was the exact cause of this astonishing shrinkage in the business. It might be any one of a thousand things, or it might be a combination of circumstances that would be very difficult of diagnosis. In any event, Willson was shrewd enough to realize that it was up to him to go out and find it.

Failing to Keep in Touch with Customers

The first thing that occurred to him, naturally, because it was most obvious, was that since he had become so absorbed in the study of business he had failed to keep in touch with his customers as he formerly had done. He had allowed the buggy to stand idle most of the time while he was poring over some article that had interested him because it contained really valuable advice on how to make a good business into a better business. He had absorbed the advice but had failed to put it to practical use, in which respect he was like a host of other good business men.

It was in a somewhat humiliated frame of mind that Willson harnessed the team and started on a five-day tour of his territory with the purpose of having a talk with every person who might be able to throw some light on his problem. On second thought, he knew that the season had been a very unusually active one in his section.

He Noted Farmers Were Making Improvements

He had read his town paper regularly and had noted that many farmers were making improvements that he well knew were badly needed. The strange part of it was that these news items had failed to register in his mind as tips on business that he should have been getting, and that clearly enough was going elsewhere.

He wondered how his competitor was faring, but the business had not reached that stage of friendly competition where it was possible for one dealer to talk things of this sort over with another dealer in the same line, so his course was simple enough. He knew these farmers well; he could go to them and put the question to them bluntly why they had not allowed him to figure with them when they were in the market.

Trying to Figure Out the Remedy

The five-day trip lasted less than a day, for by night Willson had the whole answer and was back in the office trying to figure out the remedy. What he had learned on the very first call he made was simple enough. Old George Morgan, who had been one of his first customers, was building two barns —a good bill of lumber that would have represented a nice profit. But that lumber had come from no competing yard. It wasn't a case of "poaching," or anything of that sort. The bill had not even been figured by any neighboring yard. It seemed that Cahill had been reading a lot of stuff about the lumber "trust," until he had managed to convince himself that he had been robbed on every bill of lumber he had bought; and just shortly before he reached this conclusion one of the big mail-order houses had put lumber into its catalog.

Result of Lumber "Trust" Talk

Perhaps the appearance of all that trust talk was more than a mere coincidence; but anyway, the word had been passed around among a majority of Willson's best farmer customers that the lumbermen had a price agreement, were robbing everybody, and ought to be put out of business. As Willson said, the lumbermen were up against a combine, all right, and one of the most effective

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*Concluded from page 722, December issue.

varieties, too—determined to boycott the retailers and to buy their building material of a mail-order house that would give them what they regarded as a square deal. Willson saw a lot of mail-order lumber that day, and while much of it was not as good as the material he would have sold for the same jobs, he was forced to admit that by far the greater part of it was really good enough for the purposes for which it was being used.

Farmers Regarded Him No Longer as a Friend

After he had seen some of his friends among the farmers and had found that they regarded him no longer as a friend, Willson went back to town and got in touch with three contractors who were among his most preferred customers. These men had been buying some lumber from Willson all along, but they were handling a number of jobs on which the lumber had been bought from the catalog house, and he wanted to know how they felt about it. It did not take him long to find out that they were in very much the same frame of mind as the farmers, except that they realized, as the farmers did not, the necessity of having a local retail establishment where they could get material needed in a hurry.

Told He Was Dealing with Mail-Order People

One of them was frank enough to tell Willson that on house and barn bills he was dealing with the mail-order people, and had been for some months. He admitted that the material he received from that source was not so good as he had formerly been in the habit of buying, but said that in his experience every prospective builder was eager to save some money on materials, and this cheaper mail-order lumber, with correspondingly cheaper hardware and other materials, was a real help in landing a job as against the contractors who were doing business the old way.

Found It Was a Serious Problem

This conversation brought to light the fact that the hardware dealers were losing business, too, and by following the investigation a little further Willson satisfied himself that they had not awakened to the loss. Carrying his inquiry a little further, he ascertained that about the only merchants who were even slightly worried about mail-order competition were the dry goods and grocery people, who admitted that it was a serious problem with them.

Talking Over His Troubles with the Editor

When he had fortified himself with these facts, Willson adjourned to the office of the *Weekly Dial* for a talk with Charley Morris, the editor. For years, now, he had made it a practice to talk over his business troubles with Morris, not because of any special confidence in Morris' advice, but rather because in this keen country publisher he always found a willing and attentive listener. On this occasion, after hearing a very brief preliminary explanation, Morris closed the door of the editorial sanctum, and together these two men wrestled with a new and very large problem until after the court house clock announced midnight. And when they finished, Willson, who had started the day very much in the dark as to his business troubles and future, went home a thoroughly energized and enlightened citizen, who could hardly await the next day's opportunities to lay plans for a campaign against an enemy—as he felt—of his community.

The Mail-Order People Ousted

What part Charley Morris had in the proceedings that followed I never knew exactly, but the whole campaign that ran the mail-order people out of that section of the State was the result of collaboration between the two of them, aided, of course, by Morris' paper, which had a very broad following through three or four counties.

A Campaign of Education and Honest Competition

The whole campaign was one of education, of honest competition, of straightforward methods that were so far above reproach that no one could criticise Willson or his associates. First, he called a meeting of the better merchants of several towns and laid the whole situation before them. He knew just how much money was going out of each of those communities every month, in the shape of bank drafts and post office and express orders sent to mail-order houses, because the bankers, the express agents and the postmasters were all his friends, and had no hesitation in telling him. At first, some of the dealers refused to take the matter seriously, but he was armed with facts and they were not, so it was not at all difficult to arouse their pride and their fighting instincts.

Willson Presents His Plan

When that was done, Willson presented his plan of operation. His first proposal was that any article sold by any mail-order house at any price should be sold by the local merchants for as little, or less. This precipitated an argument, because many of the dealers raised the old contention that a large buyer like a catalog house could buy goods so much cheaper than the retailer that it could undersell the retailer and still make money. But here, again, Willson was fortified with facts. He had secured, through the assistance of a friend in Chicago, a statement showing the operating costs of one of the largest catalog houses, and had figures showing its gross sales, net profits, and dividends paid. These statistics, and some actual analyses of prices taken from catalogs, convinced all the dealers that such a program could be carried out.

Keeping Tabs on Mail-Order Prices

But here arose the question how the dealers were going to keep informed as to the prices the mail-order houses were quoting. Some one suggested that every dealer should send in for a copy of every catalog that was being circulated in the field, but this proposal Willson vetoed, because, as he said, it was not fair competition. He proposed, instead, that every dealer should borrow one or more catalogs from some friendly customer, so as to get a

line on the prices quoted, and that every time a dealer convinced a buyer that he was able to undersell the mail-order people, and thereby secured an order, he should allow a cash discount on the sale, conditioned on the customer agreeing to secure the dealer's price on any goods wanted before sending away and buying them by mail.

Interpreting Catalog-House Grades, Prices, etc.

The next step in the plan was an actual interpretation of catalog house grades, brands and prices, covering all sorts of merchandise, and their comparison with grades, brands and prices offered by the home stores. This feature of the campaign was to be worked out through advertising in a number of county weeklies, the idea being to bring home to the consumer the fact that the f.o.b. Chicago prices quoted in the catalog were not comparable with the over-the-counter prices quoted by the local dealers; that the catalogs often concealed inferior goods behind the flowery descriptive English of their compilers; that the catalogs included no credit accommodation, no chance to see the goods before paying for them, no opportunity to come back for a friendly talk about goods that had failed to give expected service, and all that sort of thing.

Explanations Needed by Dealers

All of these points required considerable elucidation to the dealers themselves, but Willson was so full of his subject that he was able to convince even the most skeptical that he was offering a plan to meet a very threatening line of competition. With all of this, too, he included provision for assessments to cover the cost of such a joint advertising campaign, and he managed to get all of the participants to agree that their establishments might be regularly visited and criticised by a committee whose business was to see that show windows were kept in attractive condition, that stocks were maintained in good order, and that every member of this merchants' organization installed some sort of system for supplying the various wants of his customers, even though those wants included goods that were not ordinarily kept in stock.

Many Dealers Indorse the Scheme

Some other features were included, and the whole plan was adopted with but two dissenting votes, about sixty dealers in various lines joining in the organization, which made the newspaper editors ex-officio members. The latter were all present at the first and second meetings, and were given an opportunity to see that their own interests were inseparably tied up with those of the dealers. The ultimate effects on the thriving towns of that part of Illinois, if the mail-order inroads should continue, were driven home with such effect that every one of the papers got busy at once and started a buy-at-home campaign of its own.

In his own business, Willson worked out some further plans. He found that he could invariably cut the prices of the catalog people 5 to 10 per cent on the same quality of goods they were offering. The difficulty had been that until this time he had not carried such grades in stock, but now he put in a stock of cheap roofing, low-grade shingles and lumber, and everything else he needed to meet the "bargain" prices of his competitors in Chicago, and he started in advertising these cheaper goods.

He soon found, however, that a customer who was attracted by the low prices would seldom buy the cheap goods after seeing those goods displayed in company with the better lines that Willson had always sold. In fact, he found that an initial purchase of 100 rolls of cheap roofing, exactly the same grade that was being sold by the Chicago people, was an overstock, because the farmer who would buy that grade of roofing from a catalog would buy better roofing and pay a higher price on having an opportunity to compare the grades.

Cheaper Stock Recommended

In lumber, however, Willson had learned his lesson, and where he formerly had inclined toward recommending the use of better grades than were necessary, just because he had always liked to use good material himself, he now recommended the use of cheaper stock wherever he found that price was a consideration with the buyer and wherever he knew that such cheaper material would fill the bill.

Another weapon he found frequently effective was a knowledge of freight rates from Chicago.

Quoting a Chicago Price

While very little of his stock came from that city, he was always prepared to quote a price f.o.b. Chicago, based on his own price less the freight, so as to afford the prospective buyer an opportunity to make a real comparison. And in this connection he says that he always found it more effective to quote a Chicago price on his own goods than to try to figure out a delivered price on the catalog-house goods, probably because by his plan he was making a straight-out offer to the customer, while by attempting to work out delivered prices on the catalog goods the customer was apt to be made to feel that the freight was not figured honestly, or that in some way this was a scheme to take an unfair advantage.

Making Capital Out of Cash Buying

Willson was able to make good capital out of the cash feature of mail-order buying, and by playing up this one thing he greatly increased the volume of his cash business. Formerly his customers had not realized that they were paying interest on bills that ran three, four, and even six months. The interest had been concealed in the price, but when he put into effect a system of discounts for cash in advance and for cash in ten days after delivery, as well as a plan permitting those who wished to do so to take advantage of the discounts and settle by interest-bearing note, the majority of his better customers came back and bought for cash. More-

over, he gradually added new customers, until his business doubled in volume. It became known through the surrounding country that he would meet any mail-order price, that he was actually underselling the mail-order people on practically every line he carried, and that he was always prepared to stand behind anything he sold to the point of refunding the customer's money if the purchase was not satisfactory.

Customers Must Be Weaned from the Catalog Habit

Willson felt, however, that his own business would never be safe until his customers were weaned from the catalog habit, so he kept behind the organization of merchants, devoted much time to its affairs, prodded all his neighboring dealers until they regarded him as something of a nuisance, kept them spending their money for advertising, improving their stores and stocks, and in every possible way devoted himself to the task of uprooting the mail-order evil from the community. That his efforts were successful is indicated by the fact, as he tells it, that in twelve months the volume of remittances to catalog houses had been cut in two. To-day a mail-order catalog in Willson's neighborhood is a rarity, and the R. F. D. carriers have found that soliciting orders for Chicago concerns is a profitless undertaking.

Willson Entitled to Credit for Solving in His Territory a Problem of Serious Import

Of course, I have not been able to tell Willson's story as it ought to be told. He is too modest to tell all of it, even to me, and his neighbors won't give him all the credit that is coming to him until after it will be too late to afford him even a little gratification; but I know this: Willson made it pay; and to my way of thinking he is entitled to a lot of credit for having honorably solved in his small zone of activity a problem that is a lot more threatening than most people realize, and nation-wide in character.

Of course, if Willson had been the sort of merchant who believes that advertising does not pay, that all the opportunities lie somewhere else, he might readily have unloaded his yard and his troubles on some one else, and perhaps he would have been able to find some business somewhere that could be operated profitably without a struggle—without any headwork. There are such businesses, I suppose, although my travels have not brought me in contact with many of them. Then, again, he might easily have gone down to utter defeat, and no one would have criticised him very severely. Most people would have said that the odds were against him. They were, too, but he did not care to admit as much.

The Basis of Mail-Order Competition

Of course, Willson's experience with mail-order competition dates back to the day when it was even less dangerous than it is to-day. Then the catalog business was much more dependent on misrepresentation. To-day it is hardly safe to lie about merchandise that is sold through the mails, and moreover the big catalog houses now realize that their business is subject to the same immutable laws that control every merchandising enterprise. The public does not choose to be humbugged; it will not be humbugged; and the mail-order house must give value and stand behind its representations, or it is bound to fail.

Money Returned if Goods Are Not Satisfactory

One of the largest concerns in this line of business sells all its goods on the guaranty that any dissatisfied customer can have his money back for the asking, regardless of how he may have used the goods or misused them. This represents formidable competition. But the fact remains that the mail-order method of selling is economically and socially wrong. It is antagonistic to the established order of things, to the health and growth of the communities that represent the heart of the nation. It has served a good purpose in awakening the retail merchant to his true functions. By virtue of the fact that it has developed many men of the Willson type it has had a beneficial influence. But because some good may come out of an evil thing it does not follow that the evil thing is good. Catalogism is a disease and a menace, but every merchant has the remedy in his own hands. If he does not apply the remedy the fault is his.

I remember a conversation with a distinguished Illinois author some years ago, in the course of which he said that the stock in the general store in the small town where he lives looked as if it might have been loaded into a trench mortar and shot into the establishment, every article being allowed to remain just where it fell. How many stores have we all seen of that type! They must reform, or go down before the power of the mail-order catalog, which embraces in its printed pages a stock of merchandise from which nothing is missing, in which everything is orderly, of which every item is displayed to the limit of the skill of the best-paid talent in the country; a stock that is advertised everywhere, that can no longer be grossly misrepresented as it once was, and finally, that has behind it almost unlimited financial resources and world-wide reputation.

The People Who Are Blind

There are some people, I know, who are tired of the subject, who dodge every time mail-order competition is mentioned; but they are blind. They fail to see that it is going through an evolutionary development that is rendering it constantly more formidable.

And yet, after all, the remedy, as I have said, is in the hands of every merchant whose business is threatened. Willson worked it out for himself. His methods might not exactly fit any of a thousand other cases, but he worked them out to fit his own case by sheer force of logic; and any merchant who has brains enough to be a merchant can do as much for himself.

Patriotism and Building

(An Editorial Statement)

To a greater extent than any other country engaged in the great conflict, the United States is compelled to recognize the existence of a vociferous patriotism that speaks with a Potsdam accent and somewhere conceals the "Made in Germany" brand. "Don't do this, and don't do that, because by refraining you will help win the war," urge its exponents; and the astounding feature about the situation is that almost any one can issue a set of soap-box don'ts, and, if they are even slightly camouflaged with some of this pseudo devotion to national aims, they are swallowed whole by a very large part of the population, even including many men of prominence in the professional and business worlds—men who ought to be able to do their own thinking, but apparently lack the time.

It is probably true that a lot of the attempts to shut off industrial activity, to curtail trade and cripple commerce, are merely the result of silly sentimentality, but some of them unquestionably are Prussian propaganda.

In one of these classes or the other—and it does not matter much which—belongs the effort that has been made in recent months to curtail the legitimate building activities of the nation.

War necessarily shuts off purely speculative building operations. In fact, it renders them quite impossible without any prohibitory legislation, and this is as it should be. But the American people to-day stand in actual need of many millions of dollars' worth of building improvements that are in abeyance largely because a few people who pose as economists, but who in reality are either empty-headed or pro-German, have hinted that it is unpatriotic to proceed with such projects under present conditions.

No building project ought to be undertaken during the war if its prosecution will hinder the Government by taking either materials or labor needed in war work. That is axiomatic Americanism. But no legitimate building project should be deferred if it can be carried into execution without interference with the country's war work.

Many paper-shelled analysts have jumped to the conclusion that because England was forced to curtail building early in the war the United States must do likewise. They have overlooked the fact that England's situation and ours are in nowise alike. How do they differ?

Before the war, England imported building materials to meet her requirements—steel from the United States, France, Belgium and Germany; cement from the same sources; timber from the Baltic and from North America, etc. A continuance of building after the exhaustion of the stocks on hand at the beginning of the war would have meant the continuance of imports of materials. Every foot of cargo space obtainable was needed for imports of foodstuffs and munitions. Obviously, under such conditions building must yield.

Again, the white population of the entire British Empire is about half the white population of the United States and possessions. This is a white man's war. The problem with England was one of defense against sudden and violent onslaught for which the nation was almost wholly unprepared, and the obvious thing was to draw into active service every able-bodied man who could be induced or forced to serve, barring only those needed to maintain war industries. With imports and exports minimized by the submarine war, other industries had to curtail or cease operation altogether, so their interests were not greatly affected by the drive for a great army that absorbed at random the skilled mechanic and the country gentleman, the laborer and the financier. All were needed in the trenches and the fleet. But with the United States the problem is altogether different. The need, with us, is for an army of experts. England's need was numbers; ours is numbers, too, but in less degree. In much greater degree it is an army of super-efficiency, so fitted for the fight that it will make every blow a staggering blow. It must not be so large that we cannot maintain it, furnish it supplies, munitions, equipment and financial backing; and this army, assuming that the war may last another three years, will not constitute any such draft on our male population as England had to face at the outset.

The building industries and trades of the United States furnish a living to hundreds of thousands of men and women who are not now needed for war service, but whose ability to provide for themselves and to help carry the financial burdens of the war is of the highest consequence.

The fabrication of materials used in building, in the aggregate, represents an industry capable of paying in taxation the cost of maintaining a great army. But a dead or dormant industry is not taxable.

If the industries and labor dependent on building are to stagnate until peace comes, the country thereby must lose one of its great war resources—the ability of those industries and that labor to produce revenue for the furtherance of the war.

No one but an admirer of the German theory of internal financing can afford to indorse any propaganda tending to depress the earning power of the American people at a time like this. Unless we, as the Prussians have done, are to adopt the dog-chasing-his-tail monetary system, the system that utilizes debts as the security for bond issues, we must earn as we go. This is very largely a pay-as-you-enter war, as far as we are concerned, and to pay we must earn.

Not long since an important financial house announced that it would no longer advertise its facilities for lending money for building improvements because it believed that such advertising would be unpatriotic.

Not long since the Governor of a State and the Mayor of a great city loudly proclaimed their belief that public improvements should stop during the war.

Not long since a banker of national prominence said that there is no danger that curtailment of industries will impair the people's ability to foot the war bills.

But how would industries devoid of income pay taxes? How will that financial house continue to contribute to the war cause if it ceases doing business? How will earnings based on public improvements be levied against if there are no earnings?

No loyal citizen will advocate the doing of an hour's labor or the sale of a dollar's worth of merchandise if thereby the welfare of the American people is to be impaired. Prosecution of the war to an absolutely successful conclusion is the first consideration before us, and nothing must be permitted to stand in the way. If we bear in mind the obvious fact that the industrial stagnation that some people are so actively endeavoring to bring about is one of the very things that would most effectively stand in the way of attaining that foremost object, it will be possible to judge a little more accurately the merit of some of the anti-building propaganda that is prevalent.

The demands on American industries after the war are going to exceed the utmost possibilities of production. If we carry out every plan involving expansion of manufacturing facilities, better and more efficient housing of labor, betterment of transportation facilities, addition to resources for storage and distribution of American products, the American business machine will find itself overwhelmed, nevertheless. What greater commercial victory could Germany hope for than the success of a propaganda that would bring us into the peace councils as unprepared to meet the demands of international business as we were in 1914 to meet the exigencies of international politics?

The test of any building project is twofold, but very simple. Is it going to meet an actual need? Will it enable a farmer to produce more or better food? Will it enable a manufacturer to turn out in greater quantity something for which there is a legitimate demand? Will it enable a railroad to give better or greater transportation service? Will it enable a municipality or a State to take better care of its people, to give them the governmental service to which they are entitled? Will it enable a producer so to live that his productive capacity will be increased? Will it afford the business interests of a great city or a small community facilities that they need to maintain their earning power? If it will do any of these things, then the other test is, will it interfere in any way with the conduct of the war, by taking materials, transportation or labor needed for war purposes?

The American people have altogether too much hard sense to be long misled by dishonest or incompetent advice on a problem as great as this. Building is going on, just as all legitimate industries are going on, with every honest man endeavoring to conduct his affairs so as to render the Government every bit of loyal assistance in his power. We must remember that if the cost of this war is not to be saddled on posterity we must keep business going, not as usual, but as never before. We must regard the cost of the war as an added overhead that every business must help to pay; and we must remember, too, that only a *going* business can contribute.

As Seen by the Man on the Roof

Cal, the Carpenter, Says:

THERE is to be a brick convention in Indianapolis in February. I hope it won't be anything like one I once attended when a German bricklayer called an Irish hodcarrier a liar.

The Contractors' and Builders' Show is to be held in Chicago February 6 to 13; and it seems that, if anybody deserves a show in this world, it is the contractor and builder.

My advice to that man in Gardner, Mass., who is trying to waterproof a cellar with five springs under it would be to turn the building into a swimming pool.

Sometimes you can make more money on a little job than you can on a big one; but. if you want to lose money, the big job still has the class.

If you want to know the difference between a dumbwaiter and an ordinary waiter, observe the ordinary waiter when the dumbwaiter sticks.

In every fight a man wonders that the other fellow can hold out so long, and after a while he wonders that he can hold out so long himself.

The man who lays out a line to follow generally does a good job, whether it is sawing a board or running a business.

One unfortunate thing about life is that the poor job of plastering generally falls on somebody else's head.

I'll bet it was a carpenter who first learned to accent the first syllable of "customer."

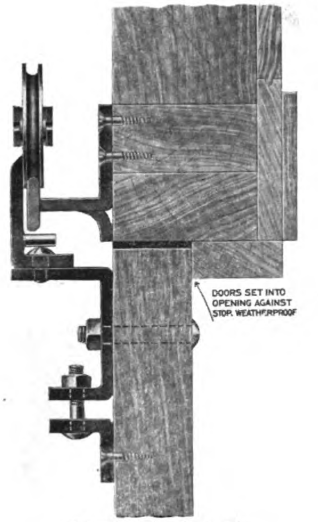
A drive in Flanders is like a drive in nailing; it may go through, but will it hold?

A wood worker may cause trouble now and then, but nothing like a wouldn't worker.

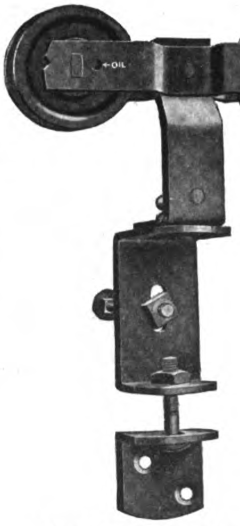
We don't mind the woman who is plain, but we dislike the plane that chatters.

Success is like a chandelier: the easier to reach the more likely to bump you.

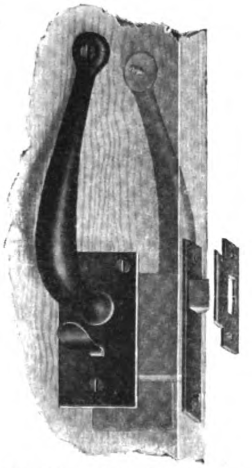
The man who designs wallpaper must often be out the night before.



Sectional view of Swivel Hanger



The Hanger operates on a swivel and turns on the track without sticking or binding in any way



The No. 27 Latch has no complicated parts to get out of order

Prepare for the Big Spring Drive

Statistics show that more automobiles are being sold this year than ever. Every car must have a home no matter how humble. Your customers will thank you for telling them about how to equip their garages with these doors.

This is absolutely the easiest working garage door set—a simple push and the doors are open; a slight pull and they are closed. There is absolutely no binding or friction. Garage doors hung with this set will work as freely and easily as any house door. Free and easy access to garage at all times may be had because one door is so hung that it will open without disturbing the other two doors.

Doors are adjustable in case of swelling or raising of cement floor. Adjustable feature prevents sagging of doors.

Doors require but a minimum of space in opening as they are hung on the inside and fold and slide against inner wall.

The price on this new set is such that it really makes the cheapest combination possible with which to efficiently equip garage doors.

Ask us about this set.

NATIONAL MFG. CO., Sterling, Ill.


Zinclad
RUSTLESS NAILS
Zinclad
RUSTLESS NAILS
3½
SHINGLE
CUT
W. H. MAZE COMPANY
PERU, ILLINOIS

Builders' Appliances and Equipment

Some Things of Special Interest to Those Having to
do with the Various Branches of the Building Business

Thatched Effects Produced by Rex Shingles

The growing popularity of Rex wide space shingles on the part of architects, builders and others concerned with the external appearance of buildings is said to be due in large measure to the architectural effects which are possible by their application as a roof covering. Typical of the unusual effects that are possible is the North Shore Golf Club house in Chicago an illustration of which is presented in Fig. 1. Not only is the tile effect of roof treatment strikingly carried out but the thatched effect is combined to produce the pleasing appearance here illustrated. The roof area in itself considered is of sufficient dimension to show the combination to advantage and one of the best features of this kind of treatment as pointed out by the makers of the shingles is the knowledge that it is not common. The claim is made by the Flintkote Company, 98 Pearl Street, Boston, Mass., and with factories at Rutherford, N. J., and Chicago, Ill., that Rex wide space shingles through the patented method of laying require less material to cover a given amount of space than is usually the case, therefore the shingles are less expensive to apply and being asphalt, slate surfaced, they are flexible and can readily be accommodated to such uses. They are 9 x 14 in. in size and when laid are spaced 6 in. apart with an exposure of 4 in. to the weather. The shingles are made in two plain colors—dark red and grayish green, also a mottled combination of both colors which is said to be very effective. The mottled shingles are said to have very much the appearance of slate on a roof and the company points out that it is extremely difficult to tell the difference between the two at a little distance.

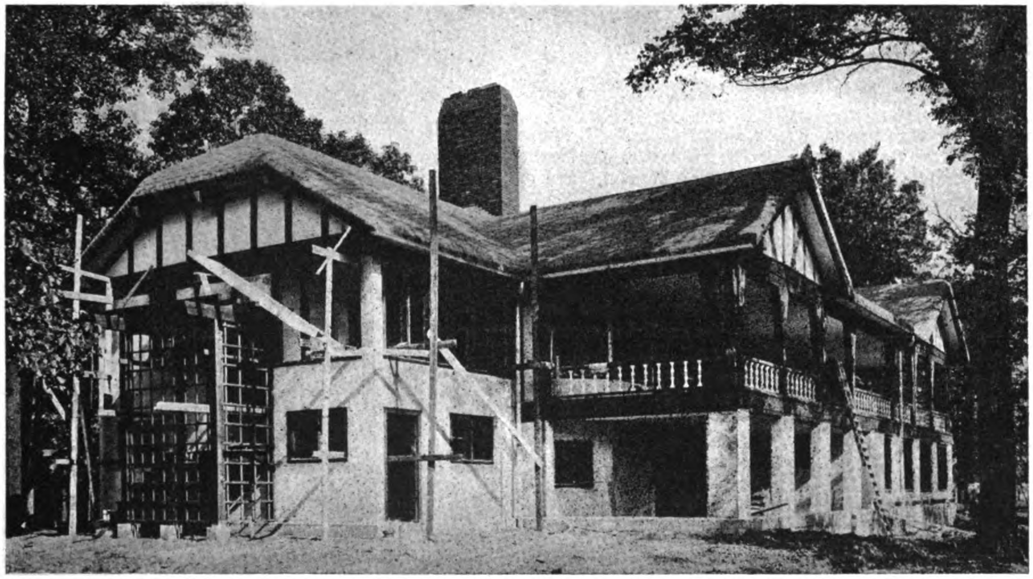


Fig. 1—Exterior View of the North Shore Golf Club in Chicago and Roofed with Rex Wide Space Asphalt Shingles

Water-tight Concrete

There has just been issued by the Hydrated Lime Bureau of the National Lime Manufacturers' Association, Arrott Building, Pittsburgh, Pa., what is known as Bulletin F-3 relating to water-tight concrete. The subject matter has to do with rather large construction work and in the preparation of the concrete, hydrated lime has been used in proportion to bring about very satisfactory results in the way of waterproofing the concrete. It is pointed out that the quantity used depends on the nature and size of the aggregates, especially the sand. The proportioning and incorporation of the hydrated lime into the concrete mixture is very simple, consisting as it does of adding to each batch of the material spread into the mixer the required amount of hydrated lime, the mixing being done in the usual manner. Years of experience have shown the following proportions to give excellent results in making concrete water-tight.

To a 1:2:4 mix of concrete add 10 lb. of hydrated lime for each sack of cement used.

To a 1:2½:5 mix of concrete add 12 lb., and

To a 1:3:6 mix of concrete add 16 lb. of hydrated lime for each sack of cement used.

Since proportioning of concrete in the field is almost always done by volume, it is well to remember that hydrated lime weighs approximately 40 lb. per cu. ft.

and that an 8-qt. pail holds approximately 10 lb.

The Bulletin in question contains a great deal of interesting information along the lines indicated, and we understand that a copy of it can be secured by any reader of the BUILDING AGE who may be interested.

The Swartwout Barn Ventilator

In connection with the ventilation of barns as represented by what is known as the Swartwout System, use is made of a rotary ventilator constructed of heavy gauge rust-resisting galvanized sheet metal. All inside members of angle iron are hot galvanized after forming on a template and punching. The bearings are of bronze accurately machined and revolve on dull metal balls. As will be seen from an inspection of Fig. 2, which represents the ventilator under discussion, the weather vane is of such size and shape as to cause the ventilator to respond to the slightest change in the direction of the wind. A wire screen prevents entry of birds into the air ducts. This ventilator is made by the Ohio Blower Company, Cleveland, Ohio, who state that it does not depend on temperature conditions to be effective. The ventilators are such as to apply the free power of the passing breeze to create a steady suction. The ventilators change position with the wind and always face away from it. The breeze in passing forms a vacuum in front of the big open mouth of the ventilator, and this vacuum sucks up the used air from below. The average wind velocity, according to the Government Weather Bureau, is over 9 miles per hour. These ventilators respond to the slightest breeze because they are mounted on large ball bearings and are so effective in creating a flow of air that all capacities are figured on an actual wind velocity of only 5 miles per hour, or only half the average speed, and one which is rarely reached. The average man, it is stated, cannot detect a 5-mile wind. The ventilator in question is also said to be easily installed, the number and size required being figured with scientific accuracy by the barn owner himself by the use of the Swartwout fresh-air unit system, which is referred to as a step forward in the science of barn ventilation. In Fig. 3 of the illustrations is shown a barn and silo, together with two of the ventilators installed at the points shown.

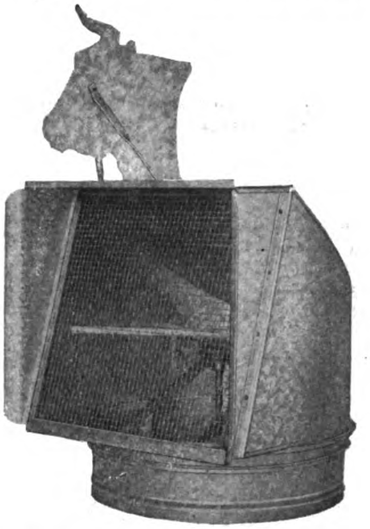


Fig. 2—The Swartwout Barn Ventilator

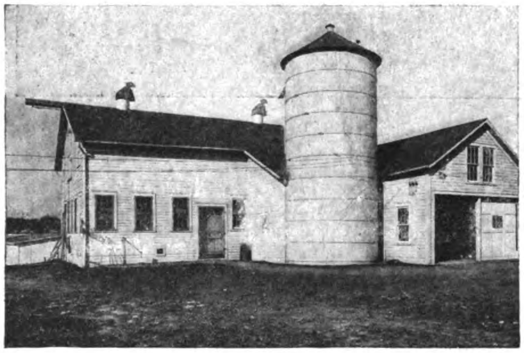


Fig. 3—A Farm Barn Showing Some of the Swartwout Ventilators in Practical Use

Durability of Cutters for Sargent Bench Planes

A striking illustration of the durability and advantages of the cutters used in connection with the bench plane made by Sargent & Company, 53 Water Street, New Haven, Conn., is presented in Fig. 4, which is a direct reproduction from a photograph. This plane has been in actual use for a long time and has been sharpened and resharpened until it has been used right up to the slot. The eye, or round hole in the slot through which the cap screw is inserted, is placed at the upper end. The cutter, therefore, having more metal at the cutting end, is not likely to break or twist when it is worn down, and the actual life of the cutter is said to be greater because of this construction. In making adjustments the cap is placed in position from the top of the cutter and is not moved over the cutting edge, thus eliminating the possibility of dulling it.

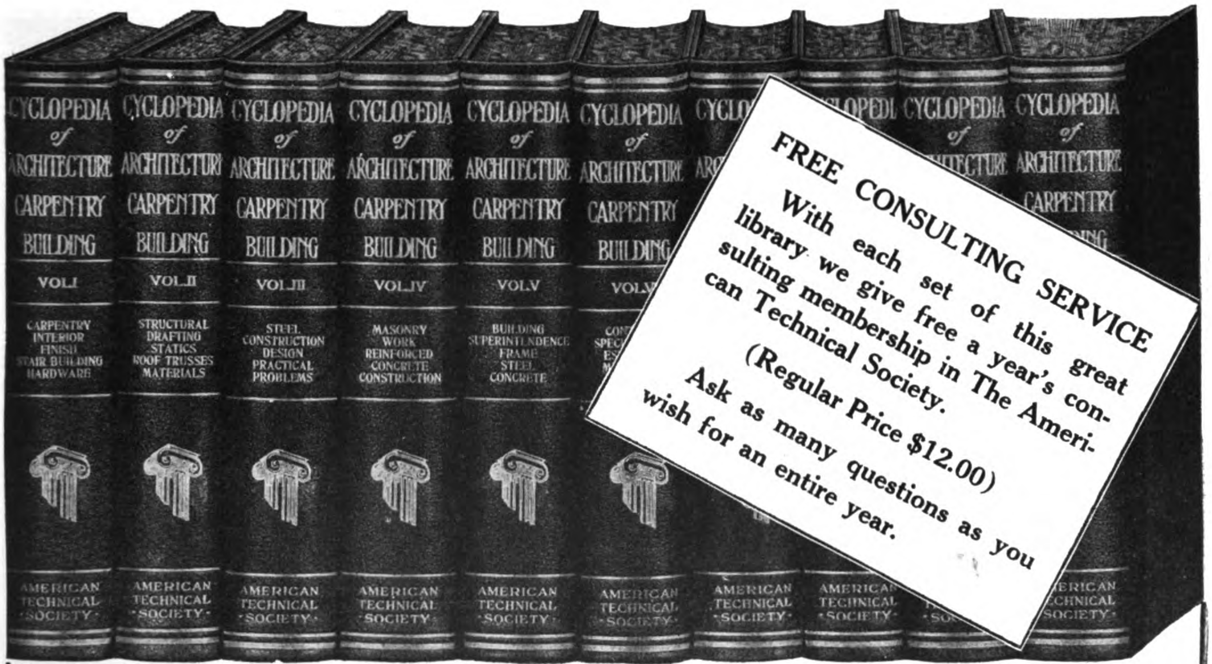

Fig. 4—A Sargent Bench Plane That Has Seen Long Service

New Appointments by Milwaukee Corrugating Co.

R. I. Schuppner was appointed sales manager of the Milwaukee Corrugating Company on Oct. 15, 1917. Mr. Schuppner is 29 years old and married, and has been with the company since 1914, when he went with them as assistant sales manager. In 1916 he was made associate sales manager, so that the last upward step indicates a well-earned promotion. Practically all of his life Mr. Schuppner has been connected with hardware, sheet metal goods and machinery, and he has had a selling experience of twelve years.

The company has appointed Charles L. Atwood advertising manager. Mr. Atwood has had many years of experience in the advertising and printing business, and in the last few years has worked on the design and

(*Continued on Page 22 of the Advertising Section*)



FREE CONSULTING SERVICE

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Ask as many questions as you wish for an entire year.

50c a Week

FOR this insignificant sum—*less than most of us spend for tobacco*—this ten-volume Cyclopedia of Architecture, Carpentry and Building is yours. Here is a set of books that contains *all* the knowledge of the leaders of the profession. The result of years of experience—the judgment of men who have made Architecture, Carpentry and Building their life work—is all yours. Completely cross indexed so that everything you want is always at your fingers' tips.

> ***Fletcher Cunningham, Shreveport, La., writes: "After receiving the books I decided that with their help I could go into the contracting business for myself. I have just closed a contract on which I expect to clear about $112.00 for two weeks' work."***

Use Them Seven Days

The entire ten-volume Cyclopedia will be sent to you upon receipt of the coupon below. Don't send a single penny—just the coupon! Pay the net transportation charges when they arrive. Use the books for seven full days before you decide whether or not you want them. If you keep them, you pay the advertising price of $24.80 in easy monthly installments of $2.00—50c a week. The regular price of this massive set is $50.00. Remember, if you don't want the books they may be returned at our expense.

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A Partial List of Contents

Mechanical, Free Hand, Perspective and Architectural Drawing, Lettering, Pen and Ink Rendering, the Orders, Superintendence, Strength of Materials, Masonry, Reinforced Concrete, Carpentry, Stair Building, Hardware, Steel Construction, Roof Trusses, Practical Problems, Estimating, Contracts, Specifications, Building Law, Sanitation, Electric Wiring and Lighting.

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Don't send us a single penny. Just fill in and mail the coupon. Then we will send the books to you by express for seven days' trial. Pay only net shipping charges when they arrive. Remember, you don't assume a single obligation—we are glad to have you see the books for yourself before you decide whether or not to buy. This offer is open to anyone within the boundaries of the United States and Canada. Send the coupon to-day—now!

American Technical Society
Dept. R. 1871 Chicago, U. S. A.

American Technical Society
Dept. R, 1871 Chicago, U. S. A.

Please send me the ten volume set of the Cyclopedia of Architecture, Carpentry and Building for seven days' examination, I to pay express charges. If I decide to buy, I will send you $2.00 in seven days and balance at $2.00 a month until $24.80 has been paid. Then you will send me a receipt showing that the $50.00 set of books and the $12.00 Consulting Membership are mine and fully paid for. If I think that I can get along without the books, I will return them after seven days at your expense.

Name ....

Address ....

Reference ....

(Continued from Page 66 of the Editorial Section)

writing of advertisements. As this company is the manufacturer of a large variety of products and uses a great deal of printed matter of various kinds, Mr. Atwood is well qualified for the position.

Samples of Beaver Blackboards

In order that architects and builders may form a good idea of the blackboard which is being furnished by the Beaver Board Companies, 116 Beaver Road, Buffalo, N. Y., there is being distributed samples of the Beaver Greenboard and Beaver Blackboard. Each sample measures 5 in. in length by 3 in. in width and clearly shows the construction. The Beaver Greenboard is a green finished blackboard which, it is claimed, will not warp, crack or bulge. The green surface furnishes exactly the same contrast to chalk marks as the black but it is much easier on the eyes. The claim is made that it will not wear shiny and is of such durability as usually outlasts the building in connection with which it may be used. The core is 5-ply Beaver board, and the surface is obtained by a series of slating coats prepared in the Beaver board plant under the direct supervision of the Beaver Board laboratories. The material comes in standard widths of 3 ft., 3½ ft. and 4 ft. and in lengths ranging from 6 ft. up to 16 ft. The Beaver Blackboard is finished black instead of green and embodies the features enumerated above. Any architect or builder who may be interested in securing samples of these blackboards can do so upon application to the address given.

Stanley's New Combination Latch

One of the latest additions to the extensive line of builders' hardware brought out by the Stanley Works, New Britain, Conn., is the new combination latch for swinging and sliding doors illustrated in Fig. 5. This latch we understand is proving very popular with the trade, owing to the fact that it is extra heavy, is self-latching on sliding doors, is reversible and strong. The claim is made that it will not catch on harness, for it can be swung over and out of the way. The No. 1120 here shown can be japanned or Stanley sherardized. The makers suggest the sherardized finish for outside work owing to the fact that it gives a non-rusting surface. In the latch here shown, the bar is 6¾ x 1⅛ in., the swivel plate is 3 x 1½ in. and the catch plate is 3½ x 1¼ in. The illustration shows the latch one-third full size.

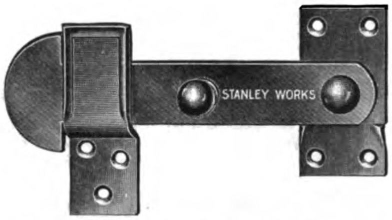


Fig. 5—Stanley's New Combination Latch

Vises for Woodworkers

A folder illustrating and describing vises for woodworkers, pattern-makers and manual training schools is being distributed by the Columbian Hardware Company, Cleveland, Ohio. These universal vises are said to hold the work exactly where it is desired, and in just the way it should be held. Operation is said to be simple. The jaw and clamping mechanism are carried in a short cylindrical hub about 3 in. in diameter and

(Continued on page 24)

Most of You Mechanics Use

DISSTON
SAWS AND TOOLS

Do You?

Ask any hardware dealer what saw the mechanic prefers and the chances are he'll tell you the **Disston.** **Most** mechanics **do** use the Disston—a recent investigation again proved that fact.

The endorsement of the majority of skilled artisans, men whose livelihood depends on tools, ought to be a pretty safe guide.

The chances are more than even that you use the **Disston** now; but if you don't, try them next time.

HENRY DISSTON & SONS, Inc.
PHILADELPHIA, U. S. A.

Branches:
Chicago Boston San Francisco Cincinnati New Orleans Memphis
Portland, Ore. Seattle Bangor Vancouver, B. C. Sydney, Australia
Canadian Works: Toronto, Canada

TRADE MARK
REG. U.S. PAT. OFF.

Showing Sun-Shade Attachment

Try This Aloe Level 10 DAYS—FREE

Easy Monthly Payments If You Buy

Prove the superior quality of the Aloe Convertible Level by testing it out for 10 days. Use it on your every day work laying out buildings, locating foundation piers, leveling up foundations, walls and floors, aligning, shafting walls, piers, etc., for getting angles, or levels anywhere and the hundred and one other things for which you would use a level or transit. Then, if you decide to keep it, you may pay for it in easy monthly payments so small that you will scarcely feel them.

Aloe Convertible Level

is more than a mere level. It is a modified transit permitting double the range of work possible with an ordinary architect's level. Its construction is such that sights above or below the horizontal can be taken, making it the finest instrument ever offered at anywhere near the price. For taking vertical sights the instrument is provided with a special convertible bracket rigidly and permanently attached to the crossbar thus eliminating the extra time that other instruments require for changing the telescope in position to take vertical readings. The telescope which is fitted with a permanent axis, rests in the bracket bearings and owing to our special constructed clips the instrument can be used for leveling while in this position if desired, although the bracket clips are easily and quickly released from the telescope axis when levels only are to be taken. The telescope is then set in its normal position in the wyes and you have overcome the old method of attaching and detaching the convertible bracket.

Your Own Time To Pay—No Interest

Remember, you are under no obligation whatever to keep the Aloe Convertible Level. We do not even ask you to promise to buy. But you owe it to yourself to see and **try** it. If it isn't all you expect you may return it at our expense. If you **do** keep it, you will find the small monthly payments easier than paying rent for an instrument—and at the end of a few months you will own it—absolutely. There's no red tape about this offer—we ask no embarrassing questions—everything is confidential—we charge no interest. You have practically your own time to pay.

Mail Coupon for Descriptive Circular

It explains the Aloe Convertible Level in detail and shows how easily the man without the training of the engineer or surveyor may secure the same accurate results as the expert. Send your name on coupon or postal for free copy and full particulars of our original, unique and popular selling plan.

A. S. ALOE CO., 625 Olive St., St. Louis, Mo.

Mail Coupon NOW

A. S. ALOE COMPANY,
625 Olive St., St. Louis, Mo.

Please send free descriptive circular about the Aloe Convertible Level and complete details of your easy payment plan. This request in no way obligates me.

Name...

Occupation...

City...State.......................

4 in. long. By loosening the sleeve which carries the hub the vise rotates on its screw and can be securely clamped in any position, a hand nut controlling this operation. The sleeve holding the entire vise is, in itself, one leaf of a heavy horizontal hinge, the other leaf being the bench-plate for the vise. The entire vise can be swung on this joint and placed in any required position just as one would turn a hinge. A rod from the sleeve back to a clamp and hand-nut connection under the bench is said to be the only mechanism. The combination of these two movements, the rotation of the vise mechanism in the collar and the swinging on the horizontal hinge pivot, is said to make the vise practically universal in operation.

A New Three-Aperture Carpenters' Level

A three-aperture cherry level for the use of carpenters and cabinet makers and designed with double plumb and double level has recently been placed on the market by Schuchardt & Schütte of 92 West Street, New York City, and an illustration of which is presented in Fig. 6. The tool is such that it can be used as a plumb or level on either side—a feature likely to be greatly appreciated by all having occasion to make use of a level or plumb.

The level glasses are protected by side glasses, which are held in position by a brass plated metal rim. The vials are cemented into cradles and held firmly by means of wood screws. Slots in the bottom of the cradles allow easy adjustment should this be found necessary. The selected cherry wood used for these tools is perfectly seasoned and kiln dried, and, therefore, will not warp.

Fig. 6—New Three-Aperture Carpenter's Level

The levels are made in lengths of 18 in., 20 in., 24 in., 26 in., 28 in. and 30 in., all of them with 2½ x 1⅛ in. cross sections. An attractive label on this tool, which is known as the makers' No. 5900, adds greatly to its rich appearance.

A New Hardwood Flooring Concern

The Rochester Parquet Floor Co., Inc., 29 Hebard Street, Rochester, N. Y., has been organized and its factory is in operation for the manufacture of fine hardwood floors, with A. J. Deyoe as president and William F. Miller as vice-president and treasurer. For the present the company will make a specialty of 5/16-in. square edge quartered white oak flooring which will include strips, blocks and parquetry designs. The company will be glad to offer suggestions if prospective customers will send accurate measurements of the rooms to be floored.

Increased Facilities for Federal Motor Truck Co.

Keeping pace with its steadily expanding business the Federal Motor Truck Company, Detroit, Mich., has just let a contract for the construction of an addition to its plant which will greatly increase the present floor space. The new building will be of brick and steel construction and will be rushed in order to be in use in time to meet the present heavy requirements. With the completion of this structure, Federal facilities will have increased about one hundred per cent during 1917.

This added manufacturing capacity will, however, suffice to meet the immediate demands only. It will be necessary to further extend the present plant in order

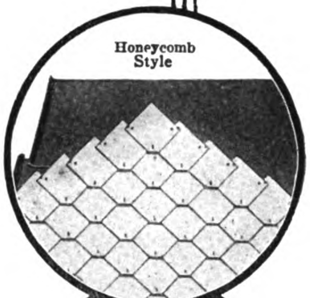
(*Continued on page* 26)

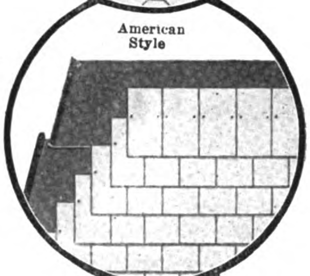
Hundreds of Contractors and Builders

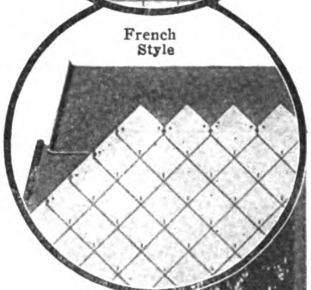
have earned their reputation through

AMBLER
Asbestos Shingles

(NOTHING TO BURN)


Honeycomb Style


American Style


French Style

and what they have done YOU can do.

Ambler Asbestos Shingles make a permanent, indestructible, fireproof roofing, and are a monument to the good judgment of the Contractor or Builder who specifies them.

They are composed of Cement and Asbestos—both unburnable, and, therefore, proof against fire. They are made in three unfading colors and many designs, and will harmonize well with any color scheme or architectural style.

As it is impossible to tell their whole story here, we will gladly send you literature, prices and pictures upon request.

KEASBEY & MATTISON COMPANY

Dept. B-2 **AMBLER, PA., U. S. A.**

Manufacturers of Ambler Asbestos Shingles, Asbestos Corrugated Roofing and Siding, 85% Magnesia Pipe and Boiler Covering, and Asbestos Building Lumber.


Residence of R. B. Picking Bucyrus, O. Roofed with Ambler Asbestos Shingles

Arch. The Keith Co. Minneapolis, Minn.

to care for the constantly growing business of the company. To this end, plans for other new buildings are now in course of preparation.

Catalog of Burt Filters and Ventilators

There has just been issued from the press by the Burt Mfg. Company, Akron, Ohio, a very attractive catalog of 128 pages profusely illustrated with half-tone engravings showing a varied line of oil filters, exhaust heads and ventilators, which are turned out in great profusion to meet a wide range of requirements. It is interesting to note in the introductory pages covering a brief history of the company that business was commenced at Akron in 1891 in a small way, the products at the time being oil filters. Previous to that date the filtering of lubricating oil with a view of using it over again was an almost unknown practice. The oil filters made by the company, however, soon attracted attention, and the great saving affected by their use was so apparent that the company's products rapidly grew in popularity. The illustrations in the catalog show different filters which are made of galvanized iron, all joints being soldered, lapped and riveted. All inside work is rigidly placed and reinforced. The filters are neatly painted and hand decorated in gold with polished brass fittings and bosses, making them an ornament to any engine room. This feature of the company's product requires 55 pages of the catalog in question and is followed by a chapter on factory ventilation which embodies many points of vital interest to those concerned in the operation of workshops, public buildings and other large structures. In this connection the merits of the Burt ventilator are set forth, one of the most important characteristics of the Burt glass top ventilator being that it constitutes both a skylight and a ventilator. Numerous half-tone engravings are presented showing bird's-eye views of plants in various parts of the country in connection with which large numbers of Burt ventilators have been used. In one instance it is shown that 176 Burt ventilators of the 20-in. metal top type are used in connection with the sawtooth roofs of an industrial plant. There is a chapter on ventilators for private residences, attention being called in particular to the upper story or attic of dwellings, which is generally dark and stuffy and insufferably hot in summer. Where a residence is equipped with one or more Burt glass top ventilators, however, the attic story becomes a well-ventilated and well-lighted room fit for any purpose desired, which in a way is equivalent to adding another story to the house. The Burt ventilator is claimed to be stormproof and can be adjusted to any degree of ventilation desired. When the glass top style is used the ventilator can be entirely closed without obstructing the light. Among the closing pages attention is given to the Burt "fan" ventilator, which is said to be so constructed that the fan operates at a speed of 350 to 400 revolutions per minute, and tests with the anemometer show that it will remove ten times more air in a given length of time than the average stationary ventilator. In case of fire the fusible links will break, thus causing the damper to drop and shut off the draft.

Bonus for Employees of Milwaukee Corrugating Co.

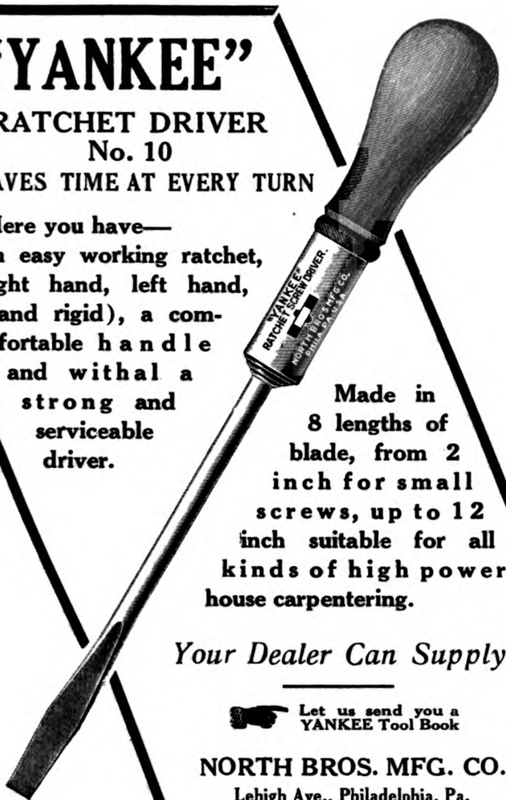
A few days before Christmas a notice was posted by the Milwaukee Corrugating Co., Milwaukee, Wis., to the effect that all salaried employees in office and factory, who had been in its employ for a year or more, would be given an additional month's salary. President Louis Kuehn and Secretary A. J. Luedke, whose signatures were attached to the notice, showed the patriotism and loyalty of the company by providing for the payment of one-half the amount of this additional salary in cash, and one-half in War Savings Certificates,

(*Continued on page* 28)

"YANKEE"

RATCHET DRIVER
No. 10

SAVES TIME AT EVERY TURN



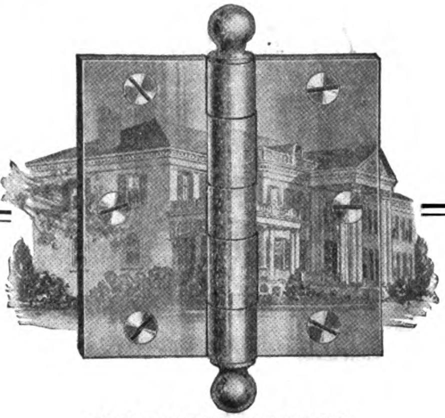
Here you have—an easy working ratchet, right hand, left hand, (and rigid), a comfortable handle and withal a strong and serviceable driver.

Made in 8 lengths of blade, from 2 inch for small screws, up to 12 inch suitable for all kinds of high power house carpentering.

Your Dealer Can Supply

☛ **Let us send you a YANKEE Tool Book**

NORTH BROS. MFG. CO.
Lehigh Ave., Philadelphia, Pa.



MODERN HOMES
want
MODERN DOOR BUTTS

Owners of modern residences with handsomely finished doors and woodwork are usually particular about the Hardware.

They want Hinges that will add to appearances. These people are quick to see and appreciate the superior qualities of the

GRIFFIN
"The Door Butt of America"

The pleasing design of these hinges and the attractive finish gives the touch that adds beauty to the home.

They give the right kind of service every time the doors are opened or closed.

Let us send Catalog and quote prices.

THE GRIFFIN MANUFACTURING COMPANY

30 Warren Street
NEW YORK

17 E. Lake Street
CHICAGO

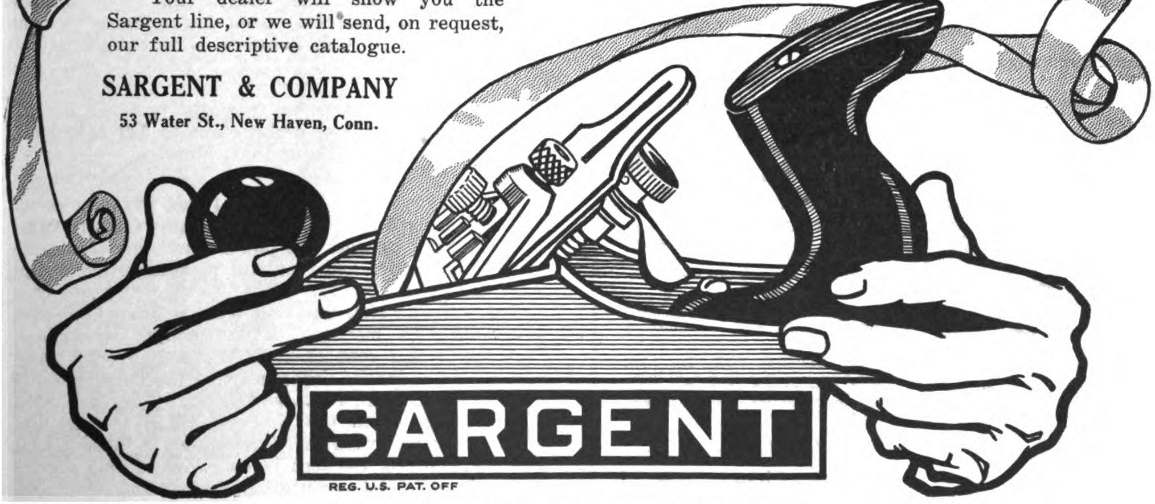
The Satisfaction of Owning a SARGENT AUTOMATIC

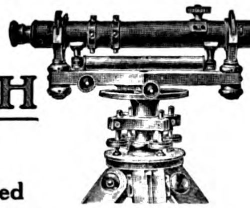
A good mechanic takes pleasure in his work, and the finer his tools the greater his pleasure and satisfaction.

SARGENT Automatic-Set Bench Planes are designed with scientific skill and care after years of experience in manufacturing high-grade planes. All parts are finely machined and the specially designed frog eliminates the possibility of chattering, and insures solidity, compactness, and simplicity.

Your dealer will show you the Sargent line, or we will send, on request, our full descriptive catalogue.

SARGENT & COMPANY
53 Water St., New Haven, Conn.





and Thrift Stamps. In this manner the company has not only given its employees an unusually generous Christmas present, but also a lesson in loyalty and an incentive to save. Needless to say, there is rejoicing among the employees.

Performance With a Pearson Automatic Shingle Nailer

A leaflet which is being sent out by the Pearson Mfg. Company, Robbinsdale, Minn., carries a copy of a letter which the company received from a contractor and builder in Buffalo, Wyo. This letter states that the builder having purchased an automatic shingle nailer about the first of April, 1915, has since that time nailed with the one machine 168,000 shingles of which he has kept tally and in addition has loaned out the nailer for other jobs. He had a contract last December for two buildings that required 38,000 shingles to cover the roof and he and his partner laid the shingles and nailed them in 28 hr. As the temperature was below zero when the work was done he had to operate with gloves on his hands. Truly, a striking record for the machine in question.

TRADE NOTES

Among the greetings for the holiday season and the New Year which have come to hand are those from Henry Disston & Sons, Inc., Philadelphia, Pa. These are engraved upon a heavy card which carries in the upper left-hand corner a bird's-eye view of the company's plant in 1840 and in the lower right hand corner a picture of the plant in 1917. *Some* difference in size. The inscription reads, "May you ever grow and prosper is the sincere wish of Henry Disston & Sons, Inc."

The Wood Mosaic Company, Inc., makes announcement under recent date that it has removed its Rochester plant to New Albany, Ind., consolidating it with the plant there so as to be close to the Indiana oak timber belt.

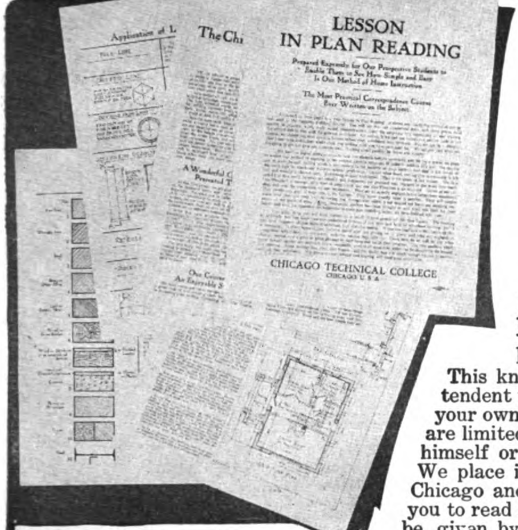
In spite of war conditions the North Western Steel & Iron Works, Eau Claire, Wis., announce that they are closing the most profitable year of their history. W. H. Kestin recently made an extensive trip through the cities of the Pacific Coast and Inter-mountain district, during which he sold five carloads of concrete mixers. With agents in fifty-two of the principal cities of the country and a stock of mixers at the most important centers, the company is in an excellent position to give prompt service.

The Hercules Gas Engine Co., Evansville, Ind., will soon start work on a new building that will practically double the capacity of their plant. This action is made necessary by the increased demand for this engine, as at the present time they are about three months behind in filling their orders.

Frederick M. Mann has recently removed his offices for the practice of architecture to 630 Metropolitan Bank Building, Minneapolis, Minn.

H. J. Richardson has been appointed works engineer for the Berger Manufacturing Company, Canton, Ohio. His new work includes the power plant, new constructions, maintenance and repair of manufacturing equipment and buildings. Mr. Richardson recently was connected with the New England Westinghouse Company, where he was manager of the gauge department. Previous to this connection he was acting chief engineer of the ordnance department of the Crucible Steel Company, Harrison, N. J., and prior to that for a long time, in fact, from the time he began to take life seriously, he was with the Commonwealth Edison Company of Chicago, the last seven years of this service having been in the engineering department.

Free Lesson



LESSON
IN PLAN READING
Prepared Expressly for Our Prospective Students to Enable Them to See How Simple and Easy Is Our Method of Home Instruction
The Most Practical Correspondence Course Ever Written on the Subject
CHICAGO TECHNICAL COLLEGE
CHICAGO U.S.A.

In Plan Reading

Accept this offer while it lasts. Send for this FREE Lesson which will show you how quickly you can learn Plan Reading by our new easy method. Not a penny to pay for it—and no obligation upon you for asking.

This knowledge is what you must have to become a foreman or superintendent in charge of building work or to go into the contracting business on your own account. Without a good knowledge of plans your opportunities are limited. The man at work doesn't get the chance to study the blue prints himself or to have their meaning explained. We make the chance for you. We place in your hands plans used in actual building work by contractors in Chicago and other cities. We explain every detail. We make it as easy for you to read a plan as it is for you to read this advertisement. Your lessons will be given by practical contractors—men in charge of building work in Chicago and they will show you how to get the knowledge that brings advancement and more money. To get full information sign and mail the coupon below.

Builders' Course on Easy Payments

Read at the left the partial list of subjects we will teach you in this Builders' Course. This is a course that gets right down to the things you need to know. Every lesson gives you information that will make you worth more in the building business. And you can get all this **on easy payments.** We don't ask you to pay all down when you enroll. A small first payment—then payments monthly —so small you will never feel the cost. Don't put off enrolling. At least send for the Free Lesson and see for yourself what this Course really gives you and how easily you can learn.

Learn By Mail

Keep your present job while studying this Course. Use your spare time at home to learn how to be a better workman, a better foreman or a better contractor. In only a few months you can complete the Course under the direction of our experts and then be ready to make a larger income. Once enrolled you have the privilege of consulting us at any time even after you have completed your studies. Our experts will always be ready to help you.

Send the Coupon

Get this information now. Learn how to make more out of your work or out of your business by knowing more about it. All this information is free. Send while the offer lasts. Whether you decide to take the course or not you ought to get this Lesson and see what it teaches in Plan Reading. Just sign and mail the coupon.

CHICAGO TECHNICAL COLLEGE,
138 Chicago "Tech" Building, Chicago

Without obligation on my part, send me the Free Lesson in Plan Reading, also information on your Builders Course in Plan Reading, Estimating, etc.

ame ....
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A Few Things We Teach

PLAN READING

How to read a building plan. Floor plans and elevations. Use and meaning of different lines on the plan. Sections and section lines. Cross Sections. How different materials are shown on the plan. How to read dimensions. Detail drawings. How to lay out work from the plans. Tracings and blue prints—how they are made. Practice in reading complete plans from basement to roof, etc., etc., etc.

CONSTRUCTION

Brickwork: Footings and foundation walls of brick, concrete and stone. Brick laying, joints in brick work, pointing, tuck pointing, etc. Brick and stone arches. Use of different kinds of stone.

Carpentry: Kinds and uses of woods, cornices, interior details, framing, roof construction, bridging, miter joints, butt joints, etc. How plans are made. Complete instructions illustrated by working blue prints. Plans and specifications. Residences, apartment buildings, factory buildings, school houses, hospitals, store and office buildings, bank buildings.

ESTIMATING

Practical rules. Problems worked out from the plans. Brickwork and carpentry. Excavations. Labor and material for footings in brick, concrete and rubble stone. Methods of practical builders. Re-inforced concrete—full plans and specifications for re-inforced concrete buildings. Estimates of labor and material required. Labor and material for brick work; figuring common and pressed brick walls of different thicknesses, etc. Chimneys, fire places and cisterns. Fire proofing, tile flooring, arches, partitions, furring, terra cotta, etc. Lumber and timber; figuring board feet. Estimating posts, girders, sills, joints, studs, bridging, rafters, etc. Estimating all kinds of roofs, floors, siding, cornices, etc. Labor for rough and finished carpentry.

Estimating mill work. Labor and material for window and door frames, sash, blinds, base board, wainscoating and all kinds of closets, cupboards, etc. Lathing and plastering, sheet metal work, exterior and interior marble jointing and decorating, glazing, plumbing, heating, wiring, etc.

ARITHMETIC

A complete but condensed course in arithmetic expressly arranged for contractors and builders. Teaches all a man in this business needs to know.

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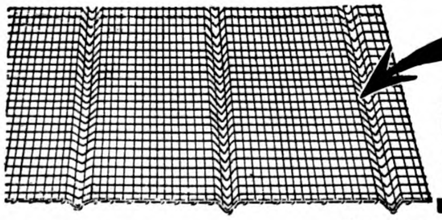

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As in the good old summer time

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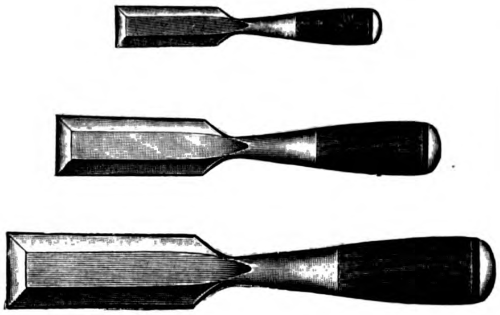

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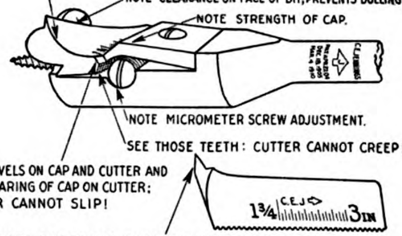

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Works well on any pitch roof. Gloves or mittens can be worn and nails driven faster than by the old way. This "Hand Nailer" is the only nailer. Throw nails in by the handful and start nailing, etc. Nails can be driven through tin or quite heavy sheet iron.

PAYS ITS COST ON ONE JOB

Two sizes: BLUE Nailer for 3d common No. 14 gauge wire nails. RED Nailer for 3d galvanized No. 13 gauge 1¼ inch wire nails.
List price $7.00 (*but an order from this ad will bring you either size by prepaid parcel post for only Five Dollars*).

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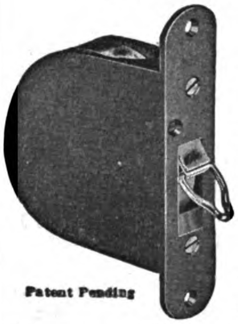
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For use in all classes of new work

Box frames unnecessary

Mortises cut at mill reduce cost of installing. Counterbalance sashes at any given point. They outwear ordinary weights and cords. Unaffected by atmospheric conditions.

Cheapest method for modernizing old windows, as alterations in sashes and frames are not necessary. Sashes should be weighed before ordering.

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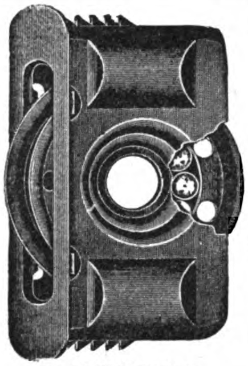
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Fasten automatically. No nails. No screws. Just bore 4 holes.

The automatic saw tooth fastening feature and the easily made mortise will save in labor the cost of the pulleys.

Frictionless, Noiseless, Everlasting.

Write for free samples.

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COPPER CABLE SASH CHAIN

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For Suspending Heavy Doors Gates, Etc.

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Desco METAL **STORE FRONTS**

Simplified Construction

Simplicity makes for permanence, for utility and for serviceability. It is an indication of a fully developed product, from which the unnecessary has been eliminated.

That is the idea back of Desco store front construction. Our long experience has enabled us to develop a construction that is simple in construction and in installation, is rich in appearance and gives perfect protection to the glass. And the price is such that it is a very profitable line for you to push.

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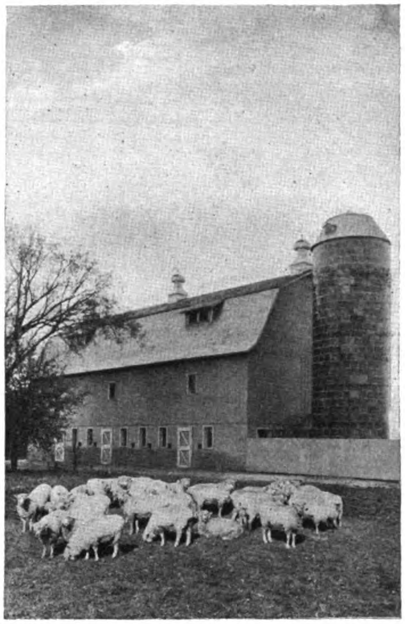
BUILDING AGE
New York, February, 1918

How a Dairy Barn and Silo Were Planned for Convenience

The Accompanying Drawings Show the Manner in Which the Work Was Done

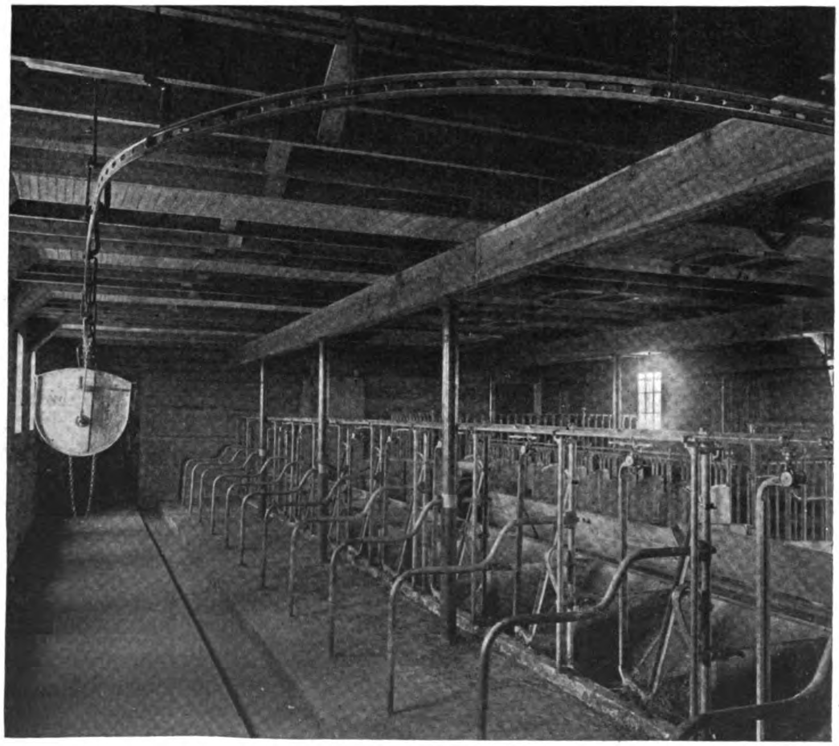


A BARN should be planned so as to render a minimum expenditure of labor necessary, especially as regards the feeding of the cattle and the removal of the litter. Furthermore, an adequate ventilating system should be provided, as fresh air plays an important part in the health of the cattle. Dairymen have established the fact that success with any kind of animals depends just as much upon fresh air as upon the more generally recognized essential features of barn construction.

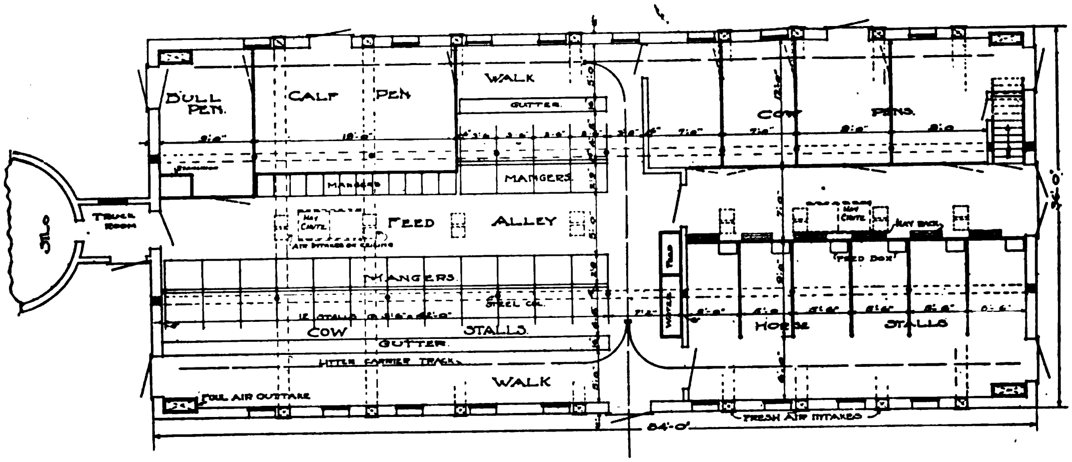
It is generally advisable not only to plan the barn with the idea of housing the animals adequately, but also to permit of a large supply of feed being kept on hand. To this end a silo is essential. The silo used in connection with the barn of Mr. J. A. Craig, Janesville, Wis., is of a type termed "The Lansing Vitrified Tile Silo," which has many advantages claimed for it. It is manufactured by the J. M. Preston Company, Lansing, Mich.

Farmers are more generally beginning to realize the advantages that accrue from farm buildings whose architectural features are of such a nature as to command attention. This requirement has also been well met in the Craig barn.

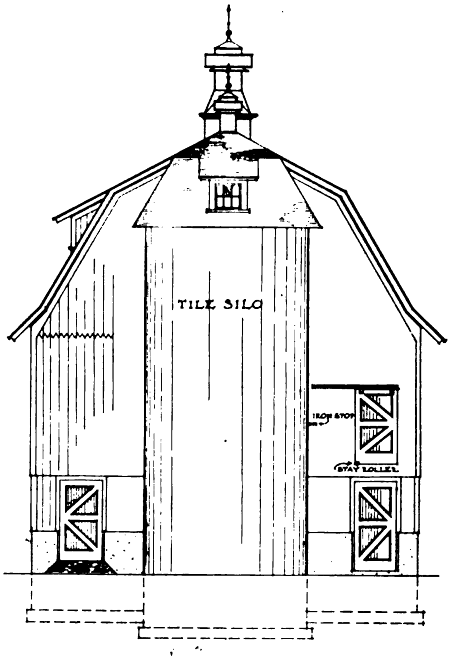
Through the courtesy of the architect, the James Mfg. Company, Fort Atkinson, Wis., and the builder, T. H. Leuz, Hanover, Wis., we are enabled to offer the accompanying very complete steps of details which show how the barn was built. These plans show the sizes and



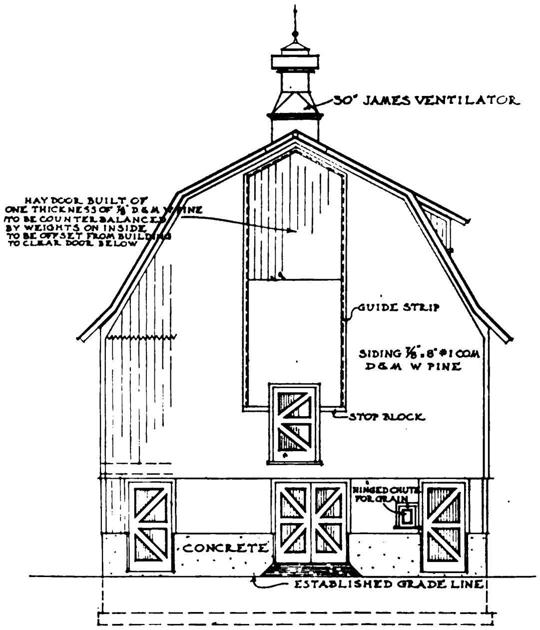
Interior of the Dairy Barn



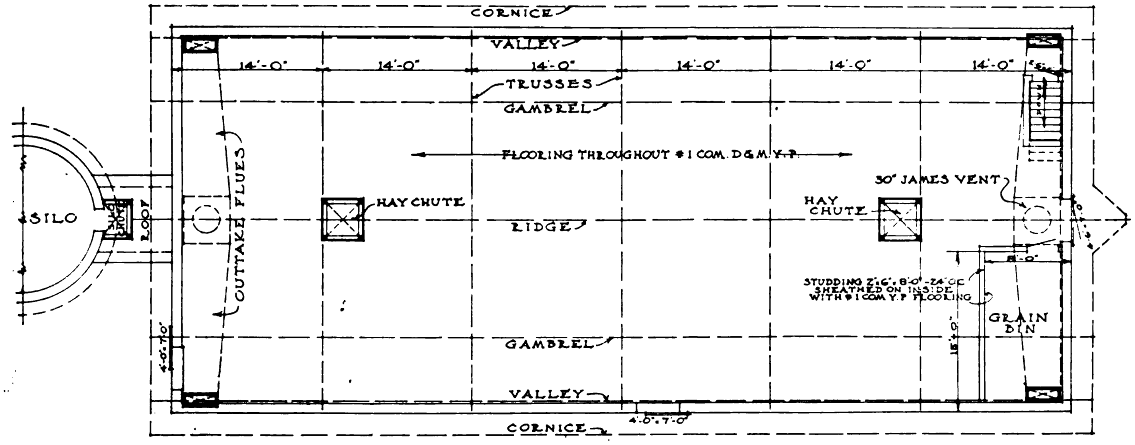
Plan of First Floor, Scale 1/16 In. to the Foot



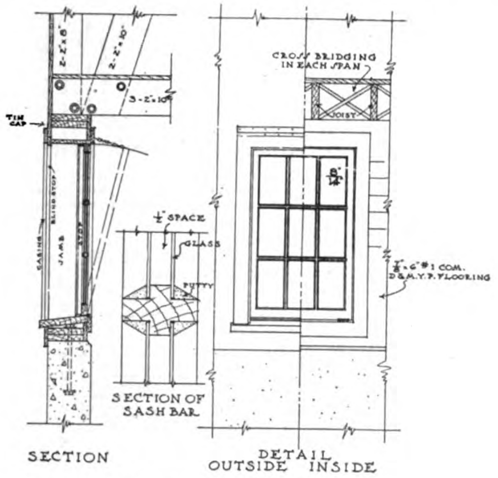
North Elevation, Scale 1/16 In. to the Foot



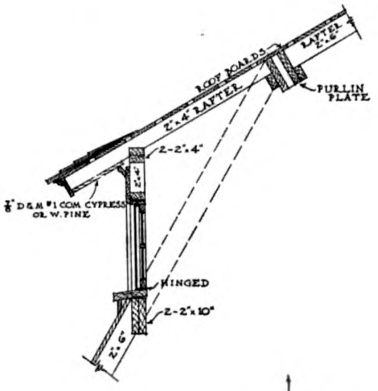
South Elevation, Scale 1/16 In. to the Foot



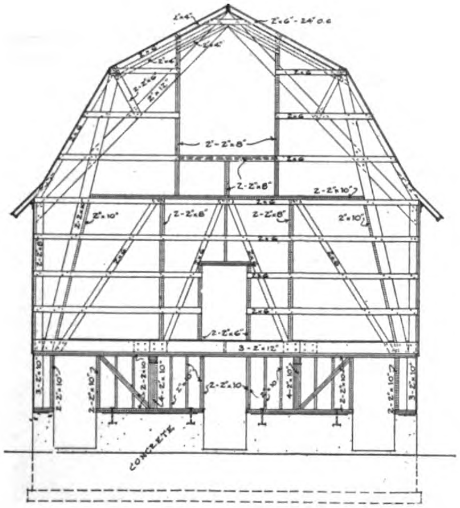
Plan of Second Floor, Scale 1/16 In. to the Foot



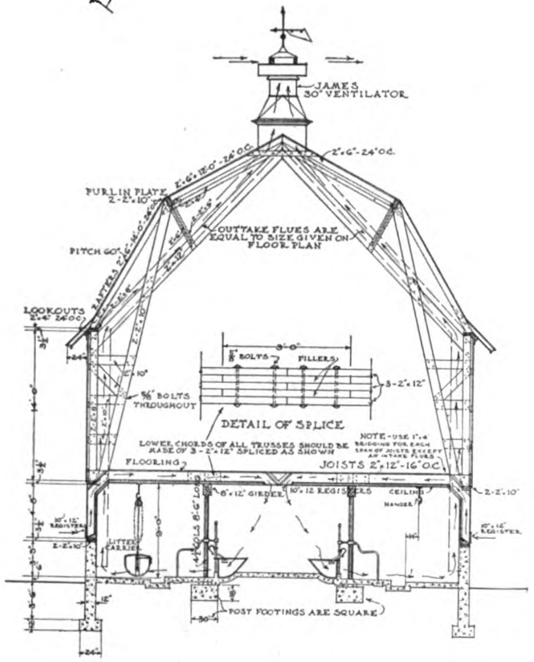
Details of Window Frames



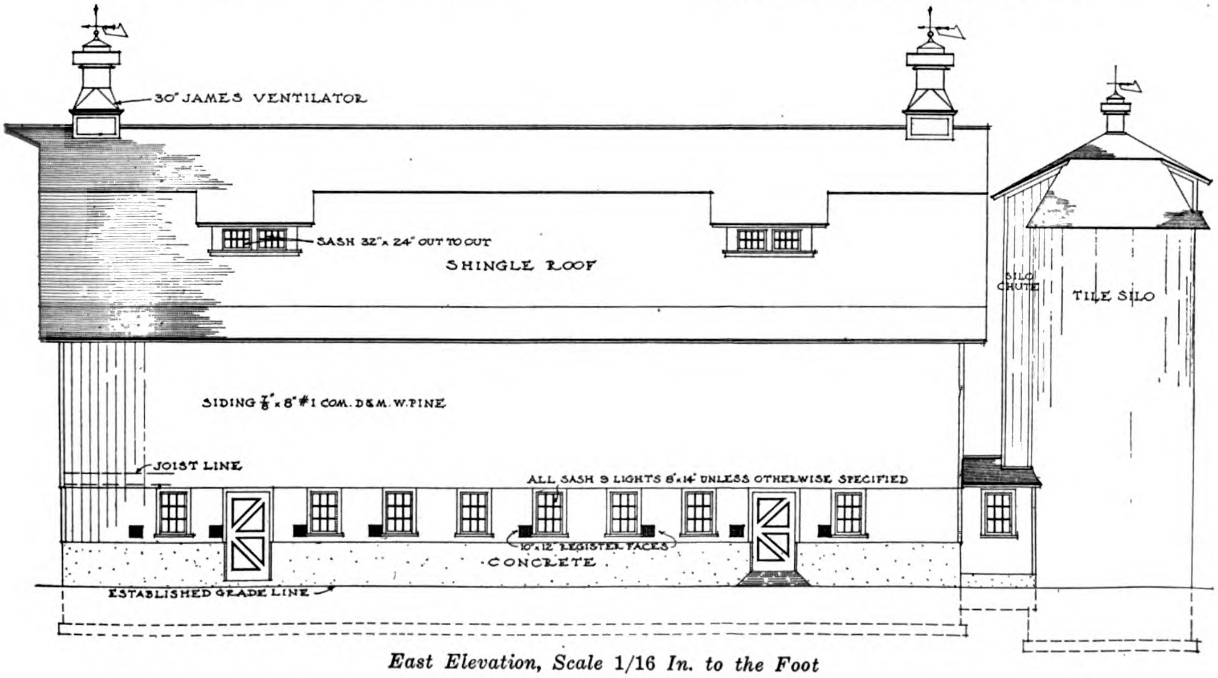
Section of Dormer Window



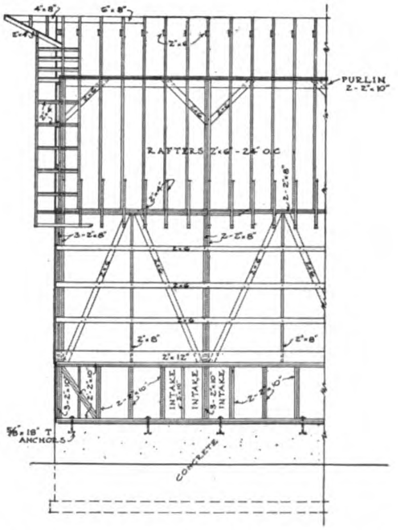
End Framing, Scale 1/16 In. to the Foot



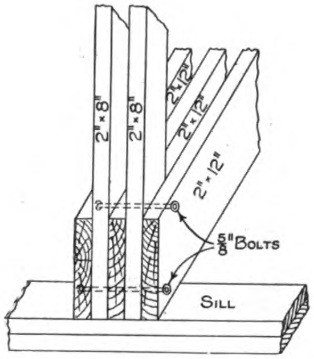
Cross Section, Scale 1/16 In. to the Foot



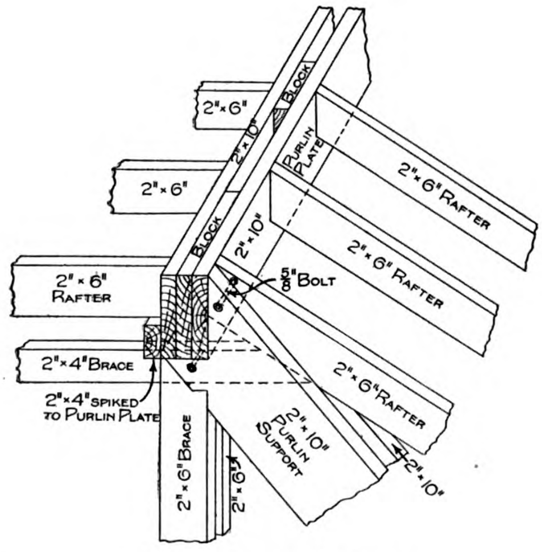
East Elevation, Scale 1/16 In. to the Foot



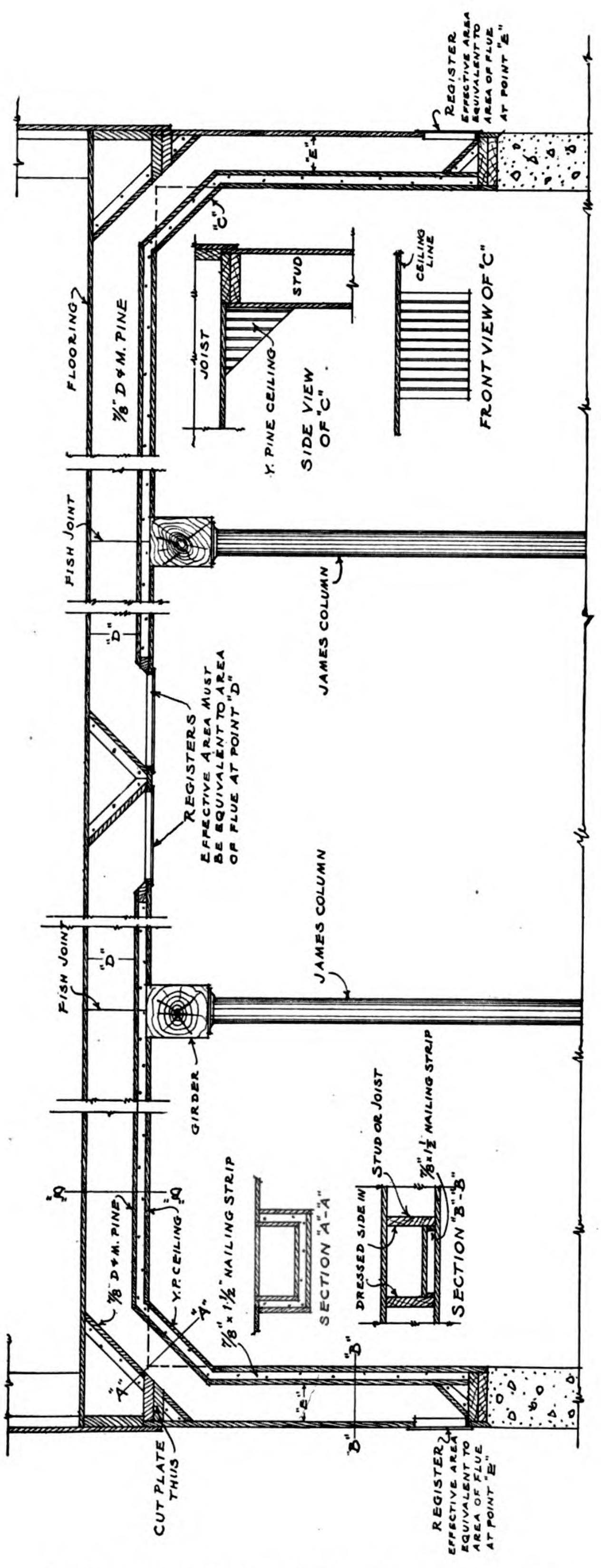
Side Framing, Scale 1/16 In. to the Foot



Detail of Tie Plate at Bottom of Trusses

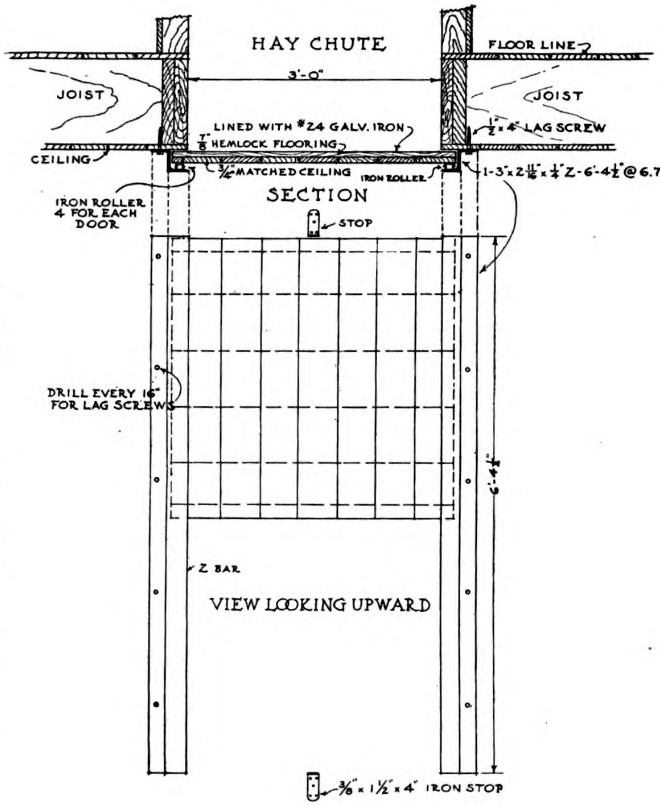


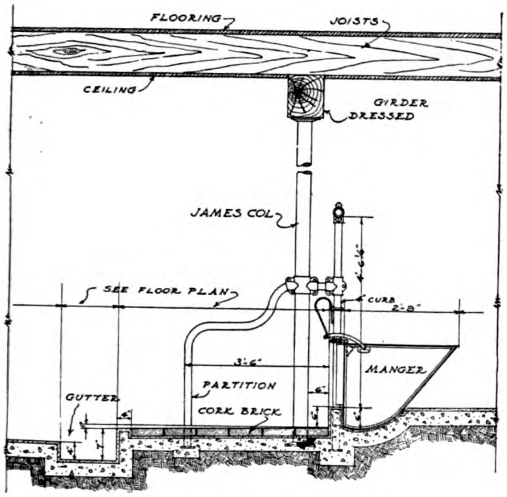
Detail of Purlin Plate, etc.



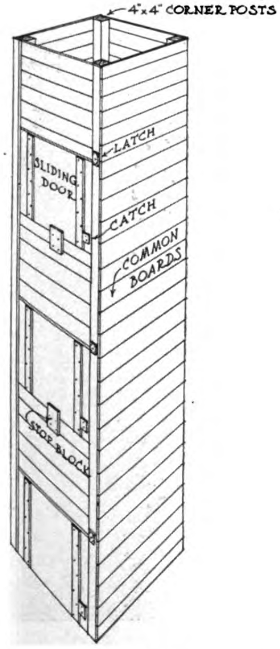
Section through Intakes Showing Details of Ventilating System, Scale 3/8 In. to the Foot

At the Right is a Detail of the Sliding Door for the Hay Chute, Scale ½ In. to the Foot

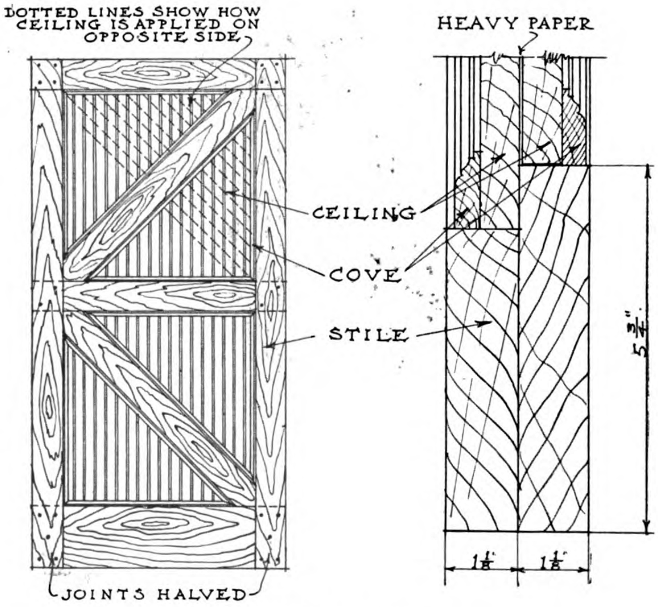




Sections of Cow Stalls



Detail of Hay Chute



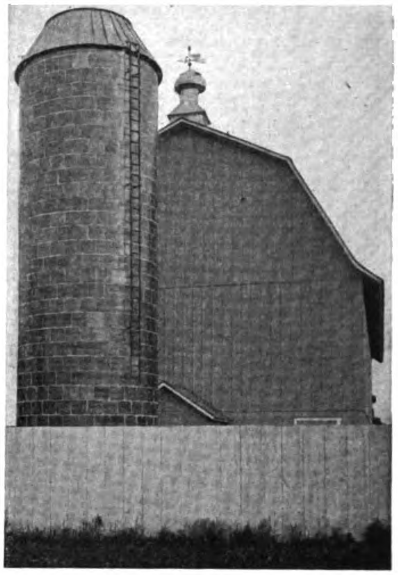
Typical Door Detail

the materials of the main framing timbers so that comment thereon is unnecessary.

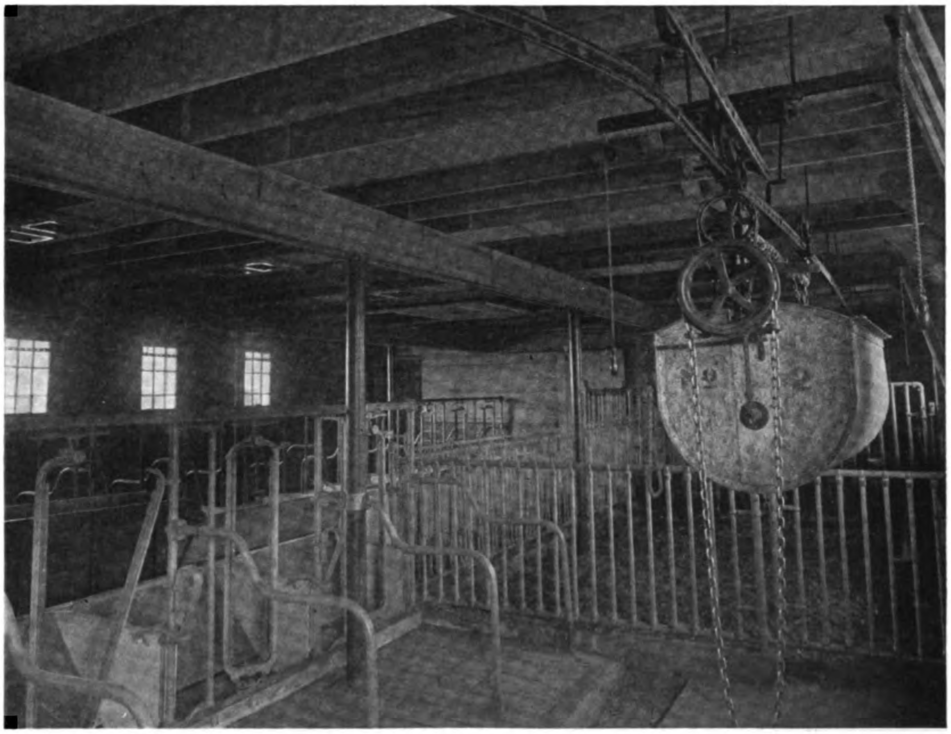
The following bill of materials is furnished through the courtesy of the builder, T. H. Lenz.

14 pieces—2 x 12—28 ft.	No. 1 Norway s1e & 1s.
4 pieces—2 x 10—26 ft.	No. 1 Norway s1e & 1s.
28 pieces—2 x 10—28 ft.	No. 1 Norway s1e & 1s.
40 pieces—2 x 10—16 ft.	No. 1 Norway s1e & 1s.
136 pieces—2 x 12—14 ft.	No. 1 Norway s1e & 1s.
165 pieces—2 x 12—12 ft.	No. 1 Norway s1e & 1s.
160 pieces—2 x 10—14 ft.	No. 1 Norway s1e & 1s.
24 pieces—2 x 10—12 ft.	No. 1 Norway s1e & 1s.
72 pieces—2 x 8—14 ft.	No. 1 Norway s1e & 1s.
10 pieces—2 x 8—16 ft.	No. 1 Norway s1e & 1s.
75 pieces—2 x 6—16 ft.	No. 1 Norway s1e & 1s.
184 pieces—2 x 6—14 ft.	No. 1 Norway s1e & 1s.
134 pieces—2 x 6—12 ft.	No. 1 Norway s1e & 1s.
10 pieces—2 x 6—18 ft.	No. 1 Norway s1e & 1s.
50 pieces—2 x 4—16 ft.	No. 1 Norway s1e & 1s.
50 pieces—2 x 4—16 ft.	No. 1 Hemlock or W. P.
14 pieces—2 x 4—12 ft.	No. 1 Norway.
4500 ft.—6, 8, 10 in.	No. 1 Hemlock roofing.
1200 ft.—8 in.	No. 1 W. P.—D. and matched 16 ft.
6 pieces—2 x 12—16 ft.	No. 1 W. P.—D. 4 sides.
240 pieces—1 x 12—14 ft.	No. 1 W. P.—D. stock.
24 pieces—1 x 12—18 ft.	No. 1 W. P.—D. stock.
88 pieces—1 x 12—16 ft.	No. 1 W. P.—D. stock.
20 pieces—1 x 12—12 ft.	No. 1 W. P.—D. stock.
500 ft.—1 x 10—14 ft. and 16 ft.	No. 1 W. P.—D. stock.
250 ft.—1 x 8—16 ft.	No. 1 W. P.—D. stock.
60 pieces—1 x 4—16 ft.	No. 1 W. P.—D. stock.
35 pieces—1 x 6—16 ft.	No. 1 W. P.—D. stock.
13 pieces—1⅛ x 6—16 ft.	No. 1 W. P.—D. stock.
3 pieces—1⅛ x 8—16 ft.	No. 1 W. P.—D. stock.
40 pieces—1 x 4—16 ft.	No. 2 W. P.—D stock.
3800 ft.—8-in. ship lap	No. 1 Hemlock 12, 14, 16 ft.
400 ft.—6 in.	Hemlock Dr. & Mat. 16 ft.
20 pieces—4 x 4—16 ft.	Y. P.—D. 4 S.
640 lin. ft.—3 x 3 split. ▧	W. P.
700 ft.—⅝ x 3½ T. P. ceiling.	
500 lin. ft.—1 x 4—16 ft.	No. 1 W. P. S. 2 S.
240 lin. ft.—½ x 1¾ O. G. window stop.	
600 lin. ft.—⅞ x ⅞ cove.	W. P.
20 pieces—1 x 12—12 ft.	No. 1 W. P. D. stock S. 2 S.
10 pieces—1⅛ x 4—16 ft.	No. 1 W. P. D. stock S. 2 S.
2 pieces—1⅛ x 6—16 ft.	No. 1 W. P. D. stock S. 2 S.
350 ft.—1 x 6—16 ft.	No. 1 W. P. ceiling 2 grooves.
4000 ft.—6-in. No. 1 Y. P. 12-16 ft. D. & M.	
41 M shingles red Cedar, 5 to 2.	Best grade Brit. Columbia Red Cedar.
18 windows, 9 Lt. 1 Sash 8 in. x 14 in., Dbl. Glazed	1¾-in. Sash.
4 Sash, 32 in. x 24 in. out to out 1⅜-in. rail.	

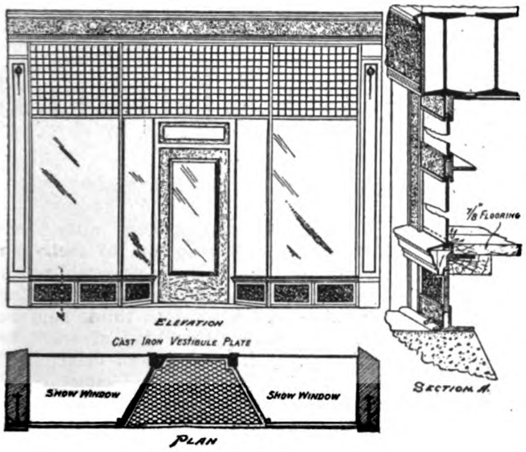
The floor plans show how conveniently the silo is located in relation to the cattle and the large haymow on the second floor furnishes plenty of space for bedding. The advantage of having a silo on the farm is well demonstrated by the experience of practical farmers, and it can generally be placed as in this barn.



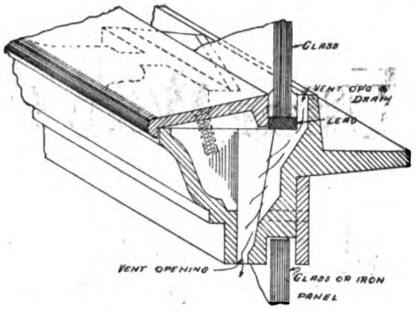
The Tile Silo and Side Elevation of the Barn



View of the Interior, Showing General Arrangement



Plan and Elevation of Store Front



Molded Vent Bulkhead

STORE FRONT ARCHITECTURE

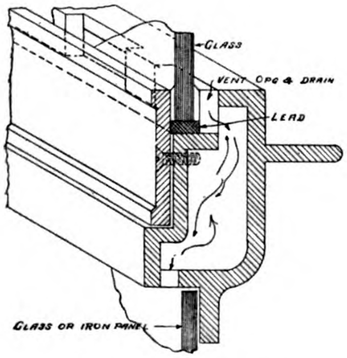
By

Store Builder

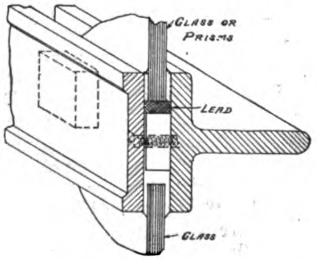
STORE front architecture is by no means the least important branch of the building industry, for upon it depends in large measure the architecture of the thoroughfares upon which the business buildings are located. In many cases the store front itself may be likened unto the frame of a picture and whatever of merit may exist in the window display, cannot afford the basis of really and genuinely artistic beauty if there be a rough unpolished and uncouth exterior foreground. The importance of an attractive store front which will afford opportunity for artistically decorated display windows illustrating the most attractive and trade inducing propositions which are to be found within the building cannot be gainsaid.

A style of store front construction designed to meet exacting requirements in this respect is illustrated by means of the details presented herewith. The construction is of iron made in the fewest number of sections possible and the designs embody the essential features as worked out by the makers during a business experience of upwards of 25 years. The store front material is made from the best grade of cast iron, thereby insuring durability and eliminating the necessity of reconstructing the store front every few years. No copper gutter is necessary, as the water of condensation is carried off through one-piece bulk head and transom bars directly to the outside of the building. All glass is set from the outside, thus enabling anyone to replace the glass, in case it should become broken, without the necessity of disturbing the interior fixtures as is often the case when glass is set from the interior. The point is made that perfect ventilation can be secured for display window purposes and the frosting of windows prevented. The construction is such that awnings that may be used are fully protected from the elements.

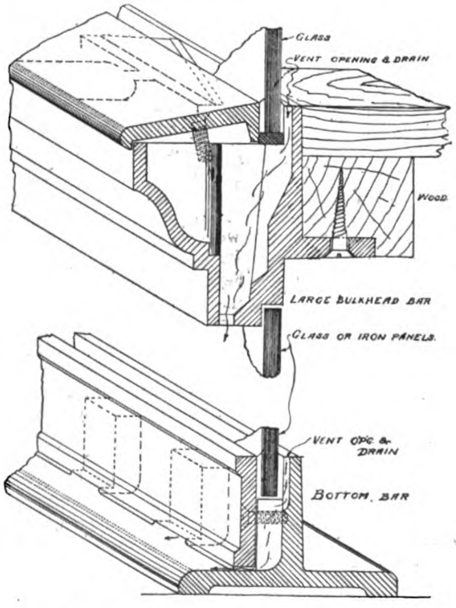
The design of cast-iron store front here shown is that of Love Brothers, Incorporated, Aurora, Ill., who manufacture small or large fronts as well as other ornamental iron work.



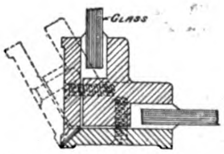
Vented Bulkhead Bar



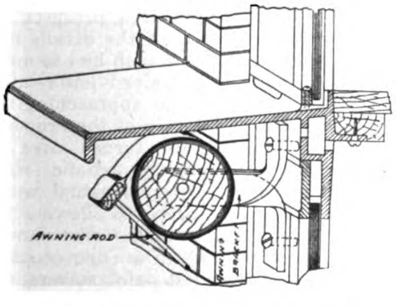
Transom Bar



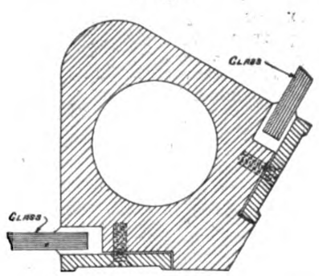
Details of Top and Bottom of a Large Bulkhead



Corner Bar for Any Desired Angle



Bar with Awning Attachment



Section Through Corner Column

Using Wall Board as a Building Material

By Joseph A. Poesl

MOST people connected with or interested in building construction understand what wall-board is. The architect who does not is indeed rare; the building contractor who does not, very likely, carries on his business in some isolated hamlet; and the carpenter who lacks this knowledge must be considered behind the times.

I say this because it is highly improbable that the wide publicity favoring wall-board for a number of years could have been overlooked entirely by these men. Why? Hardly a building journal can be picked up to-day which does not carry a wall-board advertisement. But, even assuming that for any reason a builder, architect, contractor or carpenter had missed this publicity, how long do you suppose it would take for one of his laymen friends to bring wall-board to his attention? Bear in mind before venturing a guess that sometimes approximately ten million copies of general magazines contain wall-board publicity material in a single month.

Then, we might take into account the many millions of feet of wall-board consumed every week. The permanent and artistic and satisfactory interiors resulting from this tremendous consumption are alone great disseminators of wall-board knowledge. The advertising value of a good wall-board job is invaluable; where can be found better mediums for advertising than a satisfied owner, architect, contractor and carpenter? And wall-board has accumulated an army of them within the last decade.

Wherefore we conclude that wall-board is a fully established building material, notwithstanding how little known it was only a short time ago. Its rapid rise from comparative obscurity to common usage is really astonishing. The time when it was first being aggressively introduced to the building world was opportune, for lath and plaster and other wall finishing materials were becoming expensive to such an extent that prospective builders seized it up eagerly to use instead of them. This fact partially explains why the sale of wall-board shot up from 12,000,000 to 300,000,000 feet in the short space of five years, from 1909 to 1915. Here is actually a gain of 2500 per cent. This period of wall-board industry has an apt parallel in the automobile industry.

Now, before wall-board was acknowledged as a building material, it had to overcome many obstacles that impeded its progress to that goal. First of all, the education of the public to its use was absolutely necessary, which is quite evident. To this end the very best general magazines were employed in which to advertise it. This drew a lot of inquiries, and these called for a broadcast distribution of advertising literature, prepared not so much to produce immediate sales as to propagate the utility of wall-board.

Carpenters and building contractors were reached through the building magazines. They also were appealed to along educational lines at that time.

It may strike some of us as being strange that the favor of architects never has been strongly solicited through their professional journals. The why of this is that as a class architects are understood to be always strongly prejudiced against the new, and therefore other methods have been and are being pursued to gain their endorsement, with the result that a great number of them are now writing it in their specifications.

I do not want to create the idea that architects only were prejudiced against wall-board; the fact is, there was more or less of it all around. However, I believe their opposition has been more persistent.

Prejudice is a natural trait of most everyone. It is quite natural, for we have observed so many new things fail and so few succeed that we are wary of them lest we be hoodwinked. But let us look ahead.

Wall-board is destined to have a big future. The day is not far distant when it shall rank in quantity used at par with lath and plaster as an interior wall-finishing material. Even now it can be seen in houses nearly in every land in the world. A list of these would include Alaska, South America, Australia, New Zealand, Japan and Korea.

In the last named, climatic conditions are the worst possible for wall-board, yet it is giving perfect satisfaction there. Really, there is evidently not a land in this wide world where it cannot be used to advantage.

The average carpenter and contractor are familiar with most of the merits of wall-board. But it seems that only recently have they begun to appreciate one of the most valuable benefits they secure from its use: the greater percentage of indoor work. Thereby, plasterers and lathers are eliminated from the job; they always have and always will cause a break in the continuity of the carpenter's labors, which oftentimes spells a loss of time and, consequently, money for the carpenters as well as the contractor. Moreover, knowledge that there is more inside work to do is particularly agreeable to both of them during those seasons of the year when outdoor activities are frequently interrupted by rain or snow. And furthermore, everyone is profited by doing away with the two or three weeks' delay waiting for plaster to dry.

Contractors and owners alike have been quick to appropriate to their mutual gain the singular adaptability of wall-board to remodeling and altering. The latter were wont to think long before undertaking this kind of work because of the dirt, muss and litter which usually accompanies plastering or replastering. With wall-board—as clean as finishing lumber—those hindrances are avoided. As for the contractor, he finds wall-board much in demand for remodeling and altering—the ideal winter work.

This and all else that has been said about wall-board in this article implies that house-owners are demanding it, architects are specifying it, and carpenters and contractors are gladly applying it—over a million feet every day. About two-thirds of it is supplied by retail lumber dealers or, what most of these are now, retail building material dealers. Very, very few progressive lumber dealers do not now stock such lines as roofing, cement, wall-board and such like.

As I said, two-thirds of the entire output of wall-board is sold through the retail building material dealer; the rest is handled by builders' supply houses, hardware dealers and wholesale paper houses.

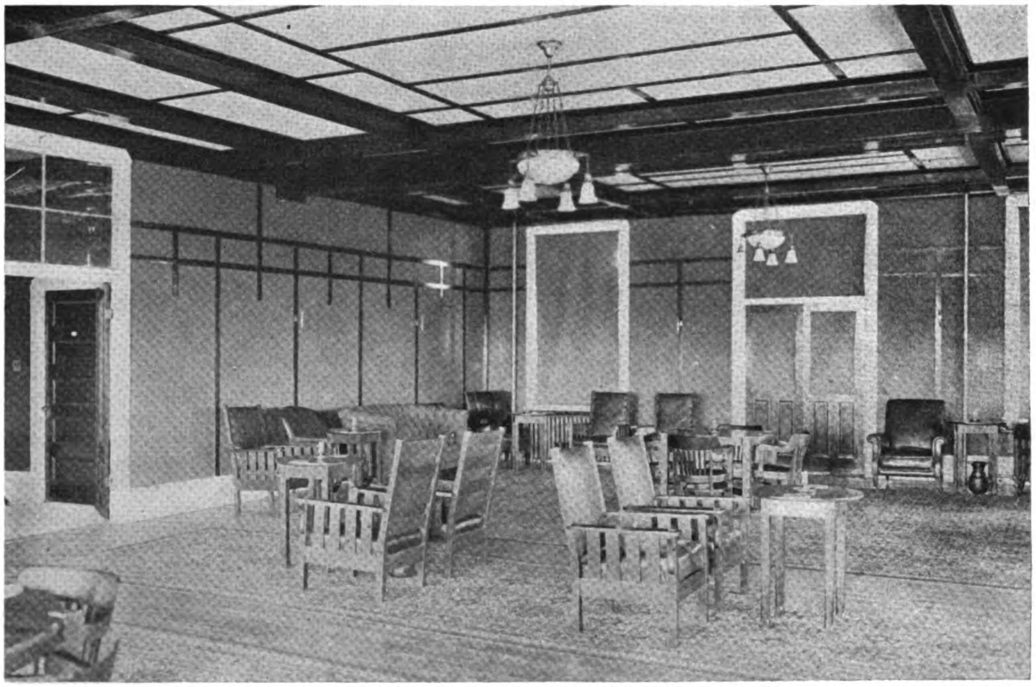
Practically all contractors favor some particular dealer with their wall-board trade. And this is, of course, as it should be, for there generally exists a close relationship between the two in the production of buildings.

Manufacturers of wall-board make it exceedingly easy for the dealer to sell their product. He is always furnished with a plenteous supply of samples and literature. He is urged to take advantage of the slides which they give him for nothing; to make use of the street-car posters to be had for the asking, and to advertise in his local newspapers with copy their experts get up especially for him, which includes electrotypes and cuts.

The entire sales organization of these manufacturers is at the disposal of the dealer. If he learns of a prospect, he simply informs them of the details and they at once co-operate with him to make the sale. A highly-trained letter-salesman loses little time in approaching the prospect. He gets plans of the proposed work, and these are turned over to specialists in planning artistic wall-board interiors. Designs, actual working drawings, are prepared showing the panel treatment for each room; decorative suggestions, which are the equal of those got out by most paint makers, are offered. I know of one concern that goes even farther by including actual photographs of rooms finished with wall-

board, similar in nature to those of the prospect. And mind you—all this goes free to someone who only contemplates work in which wall-board might be used, and even then is not obligated in any way to do so.

Here is an Unusually Large Auditorium Attractively Finished With Wall Board



Notice the Odd Panel Treatment of the Walls and the Use of Decorative Strips and Beams in Combination on the Ceiling

Now, if this kind of service with the co-operation of the dealer does not land the prospect, as it does in the majority of cases, a salesman, who is always somewhere in the neighborhood, is called in to clinch the business.

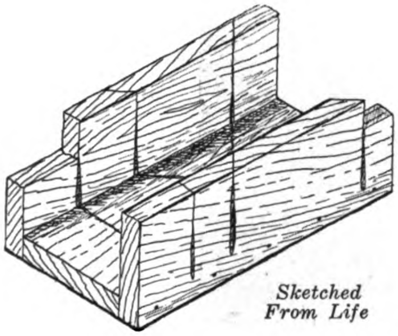
And here comes the point I wish to bring home: whether or not this business is secured by the dealer himself, he always gets it. He fills the order out of his stock. No wonder he now stocks wall-board by the half-car or carload instead of by the 5000 feet lot, as was his former custom. No wonder more than ten thousand dealers sell wall-board.

Aside from all this, a dealer is substantially benefitted by the handling of wall-board. With it he can sell the necessary decorative strips, and if he carries paint he can sell that too.

Compared with the handling of lath and plaster, wall-board has many advantages that the dealer appreciates. Here are facts concerning them: Plaster is not ultimately as profitable as wall-board. It is more difficult to stock and takes up more room. Wall-board weighs less; is not dusty, nor disagreeable to handle as is plaster. The bags in which plaster is furnished must be returned

or paid for—an expense either way not connected with wall-board. Moreover, laths are required with the plaster—which obviously means that more room for storage is needed. And, lastly, wall-board is guaranteed to give satisfactory results; whereas, a plastered wall cannot be guaranteed against cracking.

To conclude, both the contractor and dealer have in wall-board a material which can be made a valuable asset in their business; I mean the reputation, good will and advertising that result from a satisfactory job of wall-board work well done.



Sketched From Life

Some Builders Equipment I Have Known

Here Are Some Practical Hints That Can Be Made Good Use Of

By Hee H. See

DEAR friend and interested reader, the following article was not written for you, but for your neighbor. That you are found reading it is proof that you do not need the information it seeks to impart. The one big barrier to all forms of teaching, or methods of imparting information, is that those who need the information most are the very ones hardest to approach with it; the ones who never read a trade journal; never attend a lecture; never go a step out of their way to look at a new or novel piece of work or listen to a new idea. After you have looked the article over, will you please blue-pencil the mistakes, tear off this top paragraph, and then hand the remainder over to the fellow we have been talking about.

I think we may safely say that in looking for short cuts or more efficient methods too many of us overlook the small and apparently insignificant, though really important, things. Success in any walk of life depends more upon small things than upon large. It is only to be secured by the hardest kind of work and the exercise of eternal vigilance.

Anyone who is old enough to turn his thoughts back fifteen or twenty years will admit that there has been quite a number of changes in business methods during that time; the chief change perhaps being in the use of machinery.

Fifteen years ago machinery on the job was conspicuous by its absence. To-day many of the smallest jobs are equipped with a cement mixer and a power saw.

The equipment of the individual workman has also undergone a change; it is, in most cases, smaller and more easily adjusted. Instead of being stored in a chest the size of a small house it is packed in a modern metal-bound tool box, small enough to be carried on a street car, and strong enough to withstand the attacks of a railway baggage smasher—almost.

Many of the smallest contractors are to-day using power machinery on the job, and some of us older heads might be led to say, "Gosh! if I'd only had that outfit on that job of Smith's, I might have made a profit instead of a deficit." And the astonishing and pitiful thing about it is that we might just as well have had that outfit on "that job of Smith's." It was on the market, ready to use just as much then as it is to-day. The trouble was that we were asleep and no one, not even the advertiser, had the power to wake us.

I might rest my case here and leave you to think it over, but seeing that I have commented upon the importance of small things let us consider a few of the small things and see if there is anything in connection with them on which we can effect a saving.

First the saw horse. Do you supervise the construction of these essential articles, and move them from one job to another with the rest of your equipment? Or do you let Tom, Dick and Harry make new ones for every job?

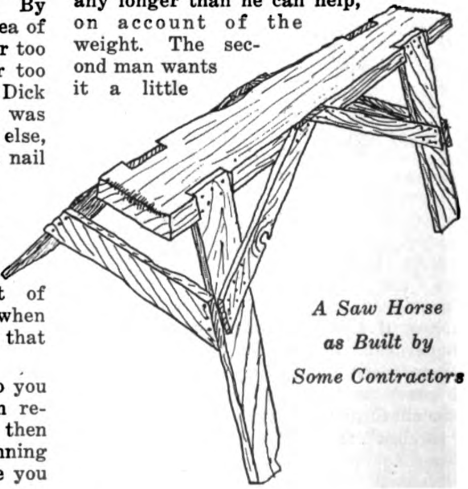
If you attend to the making of them you can have a drawing or blue print prepared, showing the proper shape and dimensions and have them made out of scrap material during spare time. By the other method, Tom, having no idea of the correct size, will spend altogether too much time making a saw horse far too large, and cut it down afterward. Dick will use up a piece of lumber that was especially ordered for something else, and Harry will do his sawing on a nail keg.

How about straightedges, plumb-rules, etc.? Are these made special and properly taken care of, or must each new job provide a new, and indifferently accurate, article out of whatever material may be at hand when the job is started? Material again that was ordered for something else.

What about your scaffolding? Do you let every job take care of itself in regard to this important item and then wonder why you are always running short of 1 x 6's and 2 x 4's, or have you tried to devise any special equipment for this purpose? Did you ever try the scheme of picking out some good, sound, tested plank, painting them a distinctive color, such as green or vermillion and keeping them for scaffold purposes only? It saves lots of worry. An easy way to test a plank for scaffold purposes is to support one end on a saw horse and then jump on the middle of it. Do you know positively whether or not there is any equipment on the market that would be of use to you in this connection, or are you going to wait another fifteen years before looking into the matter?

And then the ladders. Why is it that of all the building people the woodworker is the only one that expects to get along without ladders? Is it another case of the shoemaker's child going barefooted to bed? The painter and the mason supply their men with the means of going aloft, but the carpenter usually expects his men to shin up a studding, with the result that more material that was ordered for something else is used up for making ladders. And such ladders! Two by fours for the sides and one by six, split with a handaxe for the rungs.

The first man doesn't make the ladder any longer than he can help, on account of the weight. The second man wants it a little



A Saw Horse as Built by Some Contractors

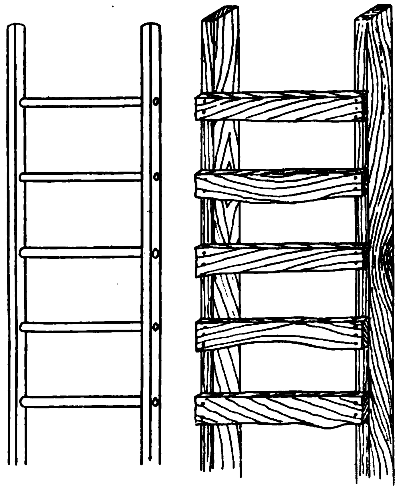
longer, so splices two or three feet onto the bottom; and in all probability, before the job is finished, some one else will splice a piece more onto the top. Ladders can usually be bought more cheaply than they can be made, and there should be enough of them; enough so that when it is necessary to go from one floor to the other we can do so without walking the full length of the building.

And now for the grindstone. The average builder's grindstone deserves a page to itself. Talk about your comic sections; we've seen grindstones with curves that Euclid never dreamed of, and with about the same amount of stability as a home made rocking chair. Oh! the grindstone; the ill-mannered, ungrateful grindstone. You give it a drink and it repays you for the favor by spitting half of the water back in your face, and pouring the remainder up your sleeve.

In the winter time, you have to boil the water before you can use the stone, and you are lucky if the man who used it before you did not leave the water in the trough so that you find the stone frozen solid. I say you are lucky if you don't find it so, but perhaps that is a mistake. If you find the stone frozen to the trough, you may decide to wait till Spring before grinding, which is much the best solution of the problem.

For the love of peace, Mr. Builder, if you have an old-fashioned hand or foot-power grindstone give it to somebody you don't like and buy a carborundum tool grinder in its place I know there are mechanics who object to them, but no one who has ever given them a fair trial would ever think of going back to the grindstone. Once the capabilities of the grinder are understood, it is quicker, cleaner, and makes a better cutting edge.

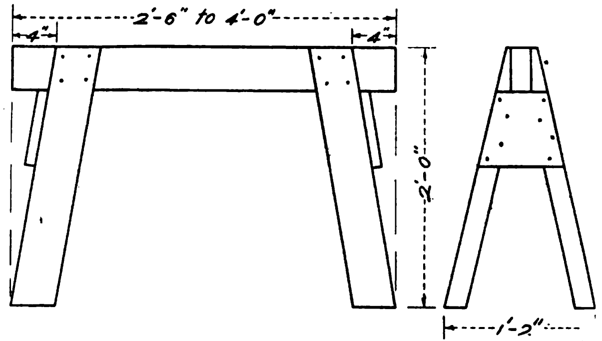
What do you use for miter boxes? Yes, I know you expect the workman to sidered from the workman's viewpoint



Which Ladder Would You Rather Climb?

are costly, awkward to carry around, easily broken, likely to be used by other workmen, and do not bring their owner furnish his own, but miter boxes, con- any extra pay or profit of any kind. Under these conditions, why should any workman invest twelve or fifteen dollars in a miter box?

When there is no iron miter box, the employer has to supply a wooden one, which again uses up time and material, and in this case there is nothing to salvage, a worn-out miter box being a total loss. It is no unusual thing to see half a dozen or more of these decrepit contraptions thrown onto the bon-fire at the clearing up of the job.



Here Is a Practical Saw Horse Which Can Be Easily Made

It is probable that the builder gets into the habit of wasting the things mentioned because he can easily make more. He usually takes every care of the equipment that he has to buy, but when it comes to saw horses, straightedges, miter boxes, etc., he says: "Oh thunder, it'll cost more to cart this stuff away and save it than it is worth; onto the fire with it."

As a general thing he is right, because most of the equipment cobbled up on the job is not worth saving when it is first made, being only a makeshift. If properly constructed and taken care of, it is as well worth saving as any other thing that costs money. It will last for years, save time and money, prevent accidents and be a source of satisfaction to everyone concerned with it.

Waste of anything at this day and date comes pretty close to being an unpatriotic act, and if we are too lazy and indifferent to look into the matter for our own sake, we yet ought to be willing to do so for the sake of the country at large.

What the Chinese Use for Roofs

THERE is no such thing as a slate roof in China, for the simple reason that slates are not to be found, so it has come about that the Celestials have adopted tiles for roofing their houses. These, however, are beyond the means of the poorer classes who have to rely upon the more insecure form afforded by straw or reeds. The very lowest strata of the population are even debarred from this and have to fall back on any scraps of material that come to hand. Such oddments as wooden boxes, old tarpaulins, old tin plates previously used for advertisements, sods of grass, reeds and cardboard have even been known to be used by the slum-dwellers.

The tiles used in the construction of houses of the better class are open to considerable improvement, and would be regarded with no small degree of wonderment in civilized countries, says a writer in the *State Trades Gazette*. Their color is black and their texture exceedingly course. The surface is rough and gritty and capable of inflicting scratches if scraped heavily by the fingers. The main essential of an effective roof covering is its incapacity to absorb moisture, and this quality is entirely missing in the Chinese tile.

With an alleged civilization considerably antedating the Christian era, one would have expected the art of building to have made more progress than it has done. If only in the method of laying tiles the crudeness of the methods still in vogue is exposed. These are not fixed and are simply held in position by the weight of the superincumbent ones. It is necessary for them, therefore, to have a considerable overlap. This amounts generally to three-quarters of the lower slate. What happens when the tiles become water-logged can readily be oimagined. The weight becomes excessive, and when a heavy downpour sets in, the strain on the under-structure is often more than it can withstand. Then there is another danger. China is the land of typhoons, and if one of the storms penetrates under the roofs, it may readily be imagined it causes no small havoc. The inhabitants frequently use the roofs as points of vantage or for cooling themselves when it is oppressively hot under cover, and for these and other reasons the roofs seldom look neat or symmetrical.

The tiles are curved and are laid in rows with the concave side uppermost. Between the rows are gutters, and fringing the bottom row are varied designs of flowers, gods, goddesses, etc.

Legal Department

Some Relations Existing Between Owner and Contractor

Although the relation of contractor and owner is a contractual relation, there are many points of law regarding contracts with which the average contractor or owner is not as familiar as he might be.

Some contractors and owners have even gone so far as to enter into contracts with minors and idiots, unaware that the first principle of contracts is that in order to have a valid contract it is necessary to have as parties to it persons who are competent to enter into a contract.

This ignorance of the most elementary rule of a subject with which both the contractor and owner should be thoroughly familiar because of everyday contact is a fair indication of the haphazard way in which they are in the habit of binding themselves, without knowing what either they or the other parties with whom they are dealing are legally bound to do. If every owner and contractor could take a course in some good law school, he would be much better off in a business way and the number of cases ever before the courts involving their respective rights might perhaps grow less and less in numbers, instead of greater and greater, as is now the case.

Oral contracts, of course, are always dangerous affairs, and for that reason the terms and conditions of an agreement should be set out in writing wherever possible.

Unfortunately even written contracts sometimes are ambiguous and complex and must be judged and interpreted according to the customs and usage of the trade and the previous dealings between the same parties.

The unquestioned superiority of the written contract over the oral one becomes clear when we remember how much less room is left for dispute and argument as to what actually was agreed upon when there is a written contract than when the contract is merely verbal.

Naturally enough, contracts with individuals are much less formal than with corporations or municipalities. In the latter cases, unless authority to contract can be shown, there can be no recovery; while the right of a mechanic's lien against an individual exists there is no such right against it and it cannot be filed on school houses, court houses and other public buildings.

So many requests for legal advice have been received from subscribers that we have decided to establish a Legal Department. All readers are invited to ask any questions that will help them solve any legal difficulty that they may be in. Our legal adviser, George Kaiser, will answer direct by mail and give his opinion as to the correct procedure. Questions and answers of general interest to the trade will be published in these columns. All inquiries must be accompanied by the name and address of the correspondent so that he may be answered direct or that he may be requested for further information if necessary to the intelligent answering of his question. No names will be published, only initials or a nom de plume. Remember that this service is free to subscribers. Address Legal Department, Building Age, 243 West 39th Street, New York City.

Of course, in some cases recovery can be had against the individuals who signed the contract, but as it often appears in cases of this kind that the individuals are not responsible persons, the right to proceed against them is not always enough.

The statute of frauds is another thing unfamiliar to too many owners and contractors.

Perhaps the most important part of this statute is the part which provides that no action shall be maintained for contracts for work which is not to be performed within a year unless the contract is in writing.

Fortunately for contractors, in view of the many verbal contracts which are being made all the time, the courts have indulgently decided and usually hold that if a contract could have been performed within a year, even though its provisions did not require it to be so performed, the statute of frauds does not apply. Thus a contract to allow a man to cut trees any time within ten years was held valid because the man could have cut all the trees within a year if he had wished to do so. In this particular case the man had not availed himself of his opportunity, but sued after the ten years had passed.

Sunday contracts, of course, are declared invalid by the law of most of our states. Oftentimes, however, a ratification on some other day of a contract signed on Sunday will be held to make the contract valid. This, of course, always depends on the wording of the statutes of the State where the contract is signed.

A mistake, if honest, in entering into a contract is something the law will usually rectify, provided it can be done without injustice to the innocent parties and provided that the party asking relief used ordinary care when he entered into the agreement.

Local customs such as the custom of measuring the number of bricks in a wall instead of counting will also be recognized by the courts. So, too, fire escapes have been held to be necessary, where they were required in building laws, though not mentioned in the specifications when the building was to be erected in compliance with the regulations of the building law.

The words "more or less," as used in a contract, pertaining to materials, have been held to mean the delivery and acceptance of the amount required in the work and not of any definite quality.

Is a Bank Liable For a Stolen Signed Blank Check?

Where a business man signs blank checks and gives them to his bookkeeper to pay bills with, and they are stolen from a desk where the bookkeeper has locked them up, the bank apparently has the right to charge its customer's account with the amount it has paid out, if it has not been negligent in so doing.

A depositor owes a duty to his bank to only put his signature to a check when he wants it to pay out money. Where a depositor signs a blank check and makes it possible for a person to tamper with it in such a way that it is impossible for the bank to detect the forgery, the loss is his own and not the bank's.

A good description of the relation of banks and depositors is contained in the New York case of Crawford vs. West Side Bank, where the Court said:

"The relation existing between a bank and its depositors is in a strict sense

that of debtor and creditor. . . . On disbursing the customer's funds it can pay them only in the usual course of business, and in conformity to his directions. In debiting his account it is not entitled to charge any payments except those made at the time, when, to the person whom, and for the amount authorized by him. . . . It receives the depositor's funds upon the implied condition of disbursing them according to his orders, and upon an accounting is liable for all such sums deposited as it has paid away without receiving valid direction therefor. . . . The questions arising on such paper between the drawee and the drawer, however, always relate to what the one has authorized the other to do. . . . The question of negligence cannot arise unless the depositor has in drawing his check left blanks unfilled, or by some affirmative act of negligence has facilitated the commission of a fraud by those into whose hands the check may come."

Must an Employer Provide Greater Safety for Inexperienced Employees?

That a mill owner who employs a man who is partially disabled and inexperienced is under a greater duty to provide him with safe appliances and a safe place to work than if he had the usual experience and was not partially disabled is the decision in a late Tennessee case, where the court decided that $2,000 was properly awarded a man because of injuries to his leg which resulted in much suffering and treatment, and a stay in a sanitarium, and possibly a year for recovery.

Suit was brought against the mill owner for $12,000 for personal injuries by a man who had been injured while employed in the mill.

The employee was a cripple by reason of injuries sustained to his left hip and ankle. He was employed to start and stop an engine in the sawmill and also to see to its proper lubrication.

After working for about four months, while descending from a pillow box which was elevated about ten inches from the engine room floor, his foot slipped and in falling down to the floor his left disabled foot came in violent contact with the brick wall of the engine room, and he was severely injured.

It appeared that he had mounted the pillow box to oil a tail box which was running hot and needed frequent attention. There was no question but that he was doing his duty in a careful manner and that the slipping was caused by the slippery condition of the floor, upon which a quantity of oil and grease had accumulated through dripping from the engine.

The Court in deciding against the mill owner said: "An unsafe floor in an engine room is not incidental to the trade or occupation of a mechanical engineer and his subordinates whose duties confine them within such engine room, and it would seem under the general rule that unless there is an express agreement to the contrary, the duty of keeping such floor in safe condition devolves upon the master and not upon the servants."

Does Furnishing Material Give a Preferential Lien?

That a sub-contractor who furnishes materials alone has no preference over one who furnishes both labor and materials, as regards their respective mechanic's lien, is the decision in a lately decided case in the New York Supreme Court.

Although this was formerly the rule in that State, it was later decided in the case of Jackson vs. Egan that apparently through mistake the law had been framed so as to give a material-man a preference over other material-men who also supplied labor, even though the latter's lien was the first to be filed.

In 1916 by Chapter 507 of the Laws of 1916, this was corrected and the New York Supreme Court has now decided that the case of Jackson vs. Egan is overruled by the new law. Siberman vs. Simon 58 L. J. 357 (Oct. 30, 1917).

Can Damage in Transit Be Subtracted from Freight Charges?

From J. L., Albany, N. Y.—Where a railroad starts suit for freight charges which it claims are due, is there any way to deduct something for damages to the goods for which the carrying charges are made? The railroad claims the Interstate Commerce Act provides freight charges must be paid only in currency.

In New York State it has been decided that when the person sued by the railroad for freight charges puts in his answer, he can at the same time put in a counterclaim for the amount of damages suffered through the railroad's negligence, notwithstanding the Interstate Commerce Act. It has been decided to the same effect in Georgia, and there the Court said:

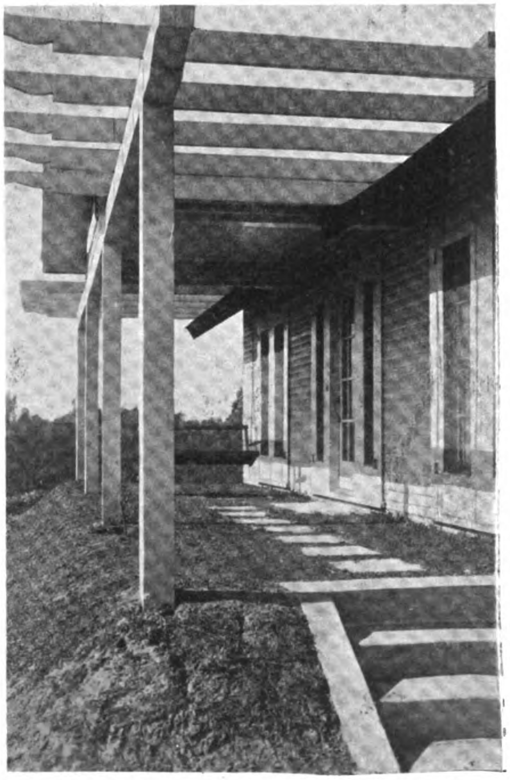
"If the shipper had sued and recovered $1,200 which he alleged to be the damage done to the shipment, and the carrier had paid over $1,200 which he alleged to be the damage done to the shipment, and the carrier had paid over twelve one hundred dollar bills, there certainly would be nothing in the spirit or the letter of the act of Congress to prevent the shipper taking four of those bills and paying the carrier its claims for freight."

Novel Porch for Small Home

By Albert Marple

HERE is something new in the way of a porch idea for the home builder and for the carpenter who is often called upon to do remodeling jobs of various kinds. It is known as a "Lippia Terrace porch." The lawn terrace is not strictly new to the landscape gardener, but the lippia terrace, especially when used in connection with the porch as here shown, is among the new arrivals. As may be seen, this porch is strictly an outdoor feature. In place of the concrete or the brick front, the dirt has been piled up almost to the height of the front door of the home, about 3 ft., and tamped until it is very solid.

A set of concrete steps has been constructed at the end of the porch, which feature runs across the entire front of the home, and from this to the front door concrete blocks, 18 in. square and 3 in. thick, have been laid. The purpose of these blocks, as may well be realized, is to eliminate the necessity of excessive walking upon the



lippia. These blocks are flush with the surface of the ground, so that they do not interfere with the operation of mowing the lippia.

The owner of this home had several reasons for using lippia in connection with his turf porch. In the first place, this plant requires very little moisture, the rain that will fall through the pergola roof being sufficient to keep it in good condition. Then, too, walking on lippia to a limited extent seems to result in no appreciable injury to the plant. The roots of the lippia are far-reaching —that is, they extend far into the earth, and for this reason they serve admirably well for keeping the earth embankment in position.

One pleasing feature of this turf porch is that roses or other flowers and greenery may be grown along its edge. This feature contains that element for which many home owners are striving in these days of beauty-loving tendencies.

An Attractive Residence of Brick

THE Saunders residence is built of dark red tapestry brick, being trimmed with sandstone for steps, sills, etc. The roof is covered with dull dark green vitrified tiles. Dark red promenade tiles are used for the porch floors.

The main hall has a well-arranged appearance, having a segment arched and beamed ceiling and pilaster effect on the sides. Opposite the entrance doors is a large brick and stone mantel, with seats on each side. Back and through the archways are the stairs to the second floor.

The dining room is 16 ft. square and is panelled up 8 ft. high in mahoganized birch. It has a cove ceiling. Both hall and dining room ceilings are richly decorated and the electric lighting fixtures throughout the house are of good design.

The pantry, kitchen, store room, etc., are well arranged. Under the kitchen is a completely fitted-up house laundry. Under the dining room and family chamber is the fuel cellar, with hot water heater, vacuum cleaner, garbage incinerator, etc., all complete.

On the south side of the first floor are the family chamber, sleeping porch, and nursery. Adjoining is a bathroom with glass-lined shower, porcelain tub and tiled floor and walls. In the passage is a hat closet, linen closet and a large silver safe concealed behind the wainscot paneling.

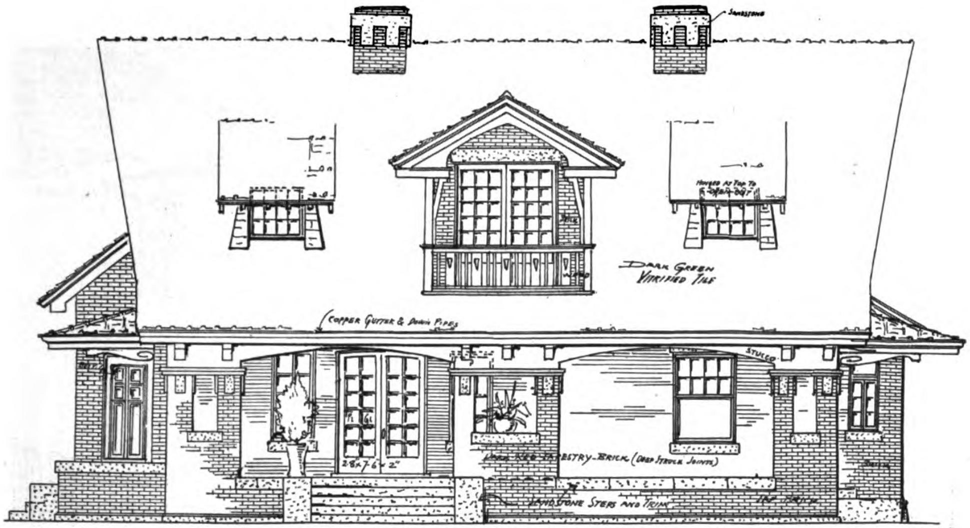
On the second floor is the family living room with bookcases each side of the mantel, and a large balcony on the west side. Back over the dining room is a large attic fitted up with cedar closets, etc.

Over the chamber and nursery are two guest rooms and adjoining bath complete.

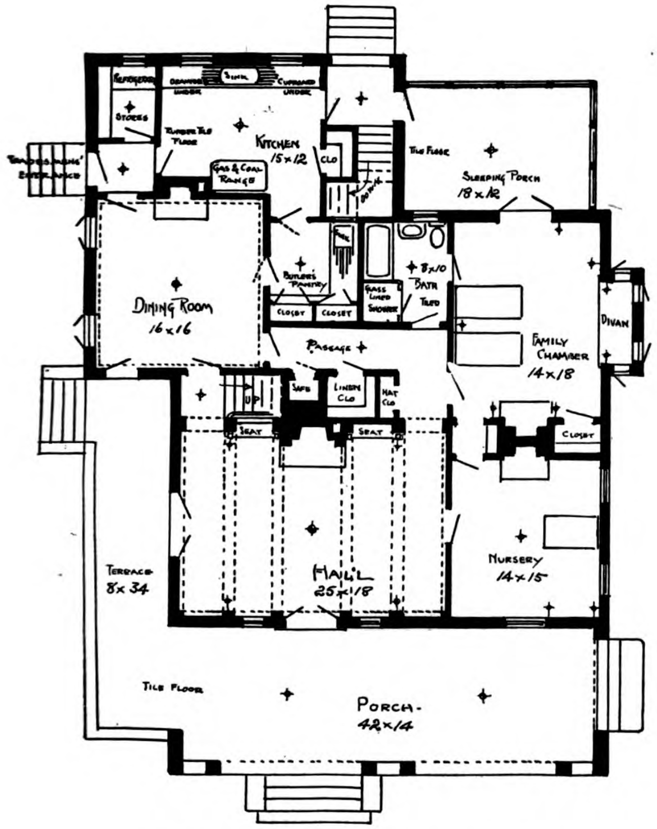
All floors are double and of oak, except the kitchen, which is rubber tile. Woodwork, except the dining room, is of oak stained in different shades for the hall stairway and living room. The woodwork of the chambers, baths, pantry, kitchen, etc., is in cream enamel, except the doors, which are in natural oak.

This residence cost $15,000, including cement walks, laying out the grounds, etc. It was designed for Dr. Aubery Saunders, Pensacola, Fla., by W. C. Frederic, architect, Pensacola.

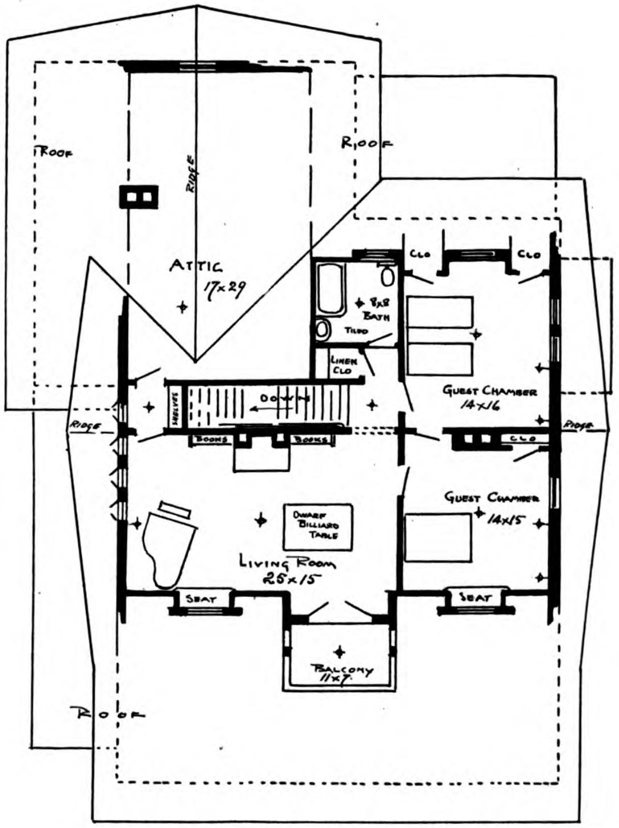
View of the Residence



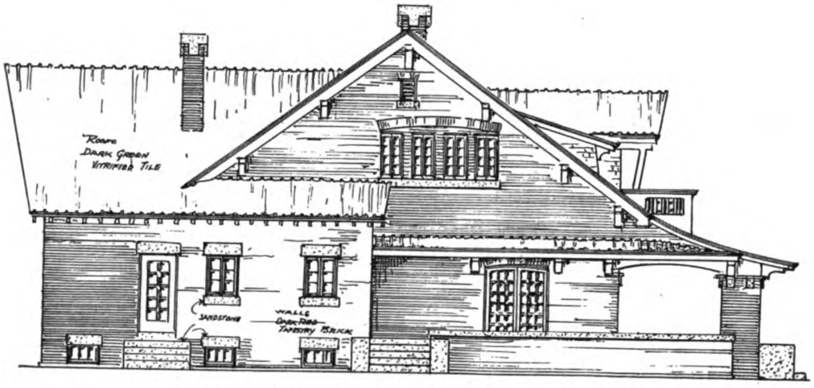
Front Elevation, Scale 3/32 In. to the Foot



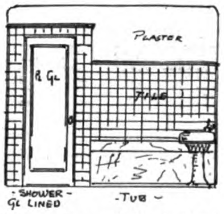
Main Floor Plan, Scale 1/16 In. to the Foot



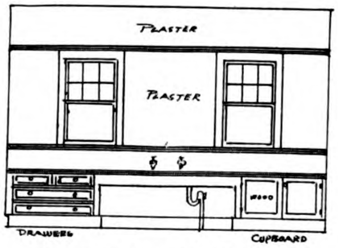
Second Floor Plan, Scale 1/16 In. to the Foot



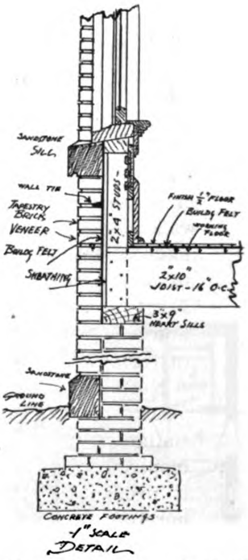
Left Side Elevation, Scale 1/16 In. to the Foot

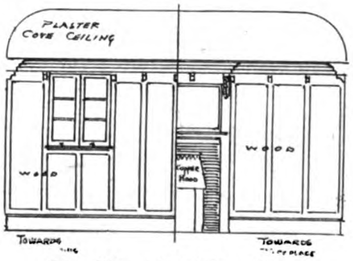


Elevation of Tub Side of Bath Room



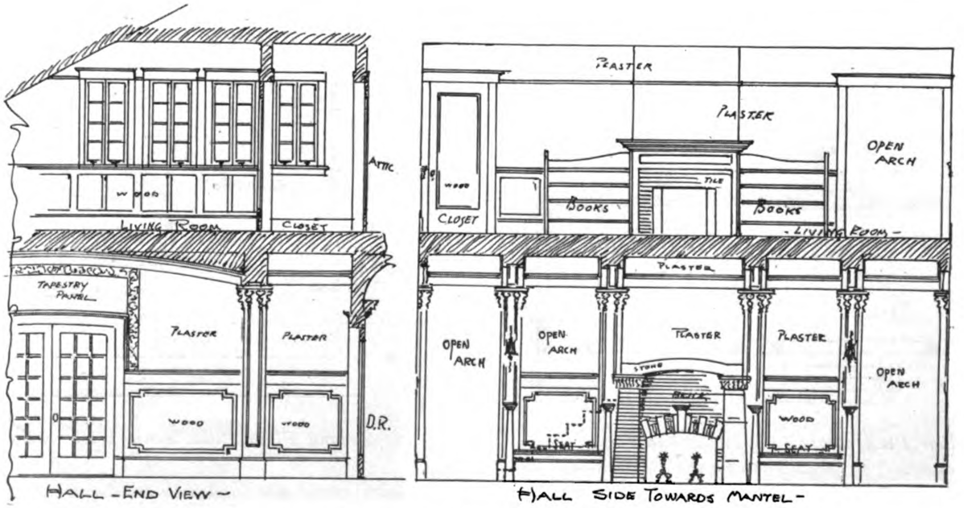
Rear Wall of the Kitchen





Panelling of Living Room

Vertical Section of Wall



Vertical Section Through the Front of the House and Taken on a Line Along the Hall

Fig. 5

Out-of-Door Furnishings

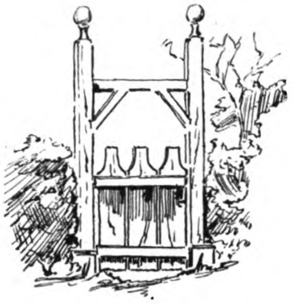


Fig. 6

Examples of Work Which Can Be Used to Good Advantage

By Paul D. Otter

THROUGH the medium of concrete, substantial character, at a low cost, may be expressed in the dwelling, detached building, or other forms of construction, and especially is this true of all embedded objects. or garden furnishings of a semi-portable nature. Certain objects, when used in a decorative way, to add interest to a garden walk, the terrace or the pool, must of necessity, when made in wood, be so heavy as to render outline and surface subservient to durability of a short period. Forms for the same purpose in stone or concrete, however, may be much heavier, yet show lightness of form and grace, and be as enduring as rock.

Nothing could add greater charm to a country place than the consideration of certain types of Indian architecture, and, indeed, as the bungalow inspired our architects to new-found fields, so will it profit to adopt other features which may not heretofore have been suggested to give that "something" which makes for character. Figs. 1, 2 and 3, drawn from pictures taken in far-away Bhutan, in the Himalaya Mountains, Asia, are shown for their adaptation to schemes in concrete, suggestive as to their main essentials, of walls battered to an overhanging roof, this feature in itself intimating the possibilities of a delightful summer roof room.

For hot weather, Fig. 2, while below a winter room, or study, or retreat, could be arranged with a clear story of casement windows on two sides. The feature, however, is the projecting half span of an old bridge heavily timbered and built by the primitive keyed construction.

Naturally, this building, dedicated solely as a retreat for study, pleasure and quiet communion with Nature, has its proper setting on a sloping bank to a running stream, or on the promontory of a lake.

Fig. 1 is another form with a projected bridge in place of the conventional porch, or stoop. The upper balcony affords another viewpoint. This building also should be set on an embankment, to give the commanding architectural profile. How far short do we come in sky line and structural beauty in ever scraping down to an unnatural level to set our buildings?

The balcony window, Fig. 4, and the balcony landing and stairway, Fig. 3, are not without merit in injecting something of this in our concrete plans —the balcony in itself would, if set in the simplest stucco dwelling, redeem it from the commonplace.

A proper entrance to this subject logically would

Fig. 1—Projected Bridge in Bhutan, Asia

Fig. 2—Another View of the Bridge Shown in Fig. 1

Fig. 3—Detail of a Stairway in Bhutan, Asia

be through the main entrance. The first impression of one's home can convey the feeling of sheltering welcome, or be as a tight barrier, quite anticipating the cold formality of the master within, so frequently is the human element expressed in things material. For feature effect, or marked breaks, or shall we say punctuation places, to our usually admirable, though monotonous, fencings and hedges, many suggestions may be carried out from a wide range of material found in the sketchbook of an enthusiast. In the culling process, inspiration is to be found from all parts of the world, through fragments of illustrated scenes offering certain suggested detail, or sketch notes taken in traveling. Greater interest could be given our division, or property, lines by more attractive gateways, gates and even the anticipated shelter of the home, be denoted by gates with overhanging hoods.

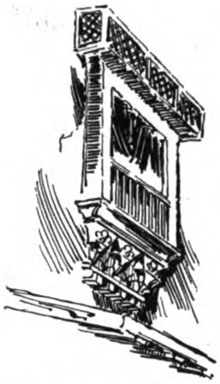


Fig. 4—A Balcony Window

As time passes, the hedge is becoming more permanently established and particularly at the side or rear entrance should the walk or path be given the dignity of a substantial framing, or at least have a fortified character of substantial posts or buttresses. We should value more the changing of the scene through our windows, by the use of varying planes, prominences and projections, as they afford not only pleasing lights and shadows in sunny weather, but are a constant source of variety under snow and winter conditions.

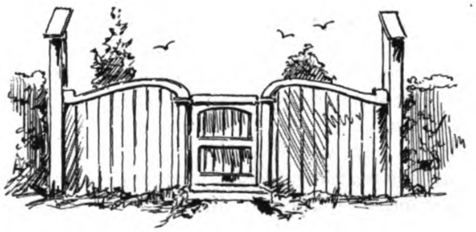


Fig. 7—An Odd Conception for a Gateway

As garden and outdoor attractiveness has been given greater attention abroad, we may draw much from varied sources.

Hungary has much to offer in quaint and picturesque detail, oftentimes suggesting a certain religious, and shrine-like character creeping into the detail pertaining to domestic surroundings. The roof, protecting gateway seat, Fig. 5, indicates a roadside shrine, while Figs. 6, 7, 8 and 9 show an interesting variety of gates and gateways, all denoting the thought of a definite stopping place. Here in America we very frequently have to hunt for the side gate, as it usually is but a division of the fence set with hinges. Note the primitive posts in Fig. 6—attractive because they are simple in outline, hand-hewn, and altogether individual.

Our fencing material, so easily obtained and set up by an unthinking carpenter, produces in the aggregate an impression when viewed from the third-story back window, of a bird's-eye view of inclosures at the stockyards, and, indeed, it would be unsafe in the darkness of night to return to one's suburban home via the back alley, so monotonously continuous are fence and gate line.


Fig. 8—An Ornamental as Well as Substantial Gate

Referring again to Fig. 6 a personal whim is quite evident in taking three ordinary fence boards and producing the simple paddle shape for top line; further character is given by the tall posts, and the top cross bar. A package of wild cucumber vine seed will, by early summer time, make doubly attractive the usual unsightly back-yard exit.

Other features in fencing and railings may be revived from mediæval England, France and lower Europe for the purpose of lightening and modifying our tendency to solid mill board filling. The fence framing the home should be as quietly attractive as a frame surrounding a much prized picture. Bulgaria and Hungary again offer much in paling and baluster outline. Figs. 10 and 11, with post, Fig. 12, are a few, the forms of which when brought together offer pleasing stencils in lights and shadows, and when used with restraint and judgment add greatly to our side and rear porch

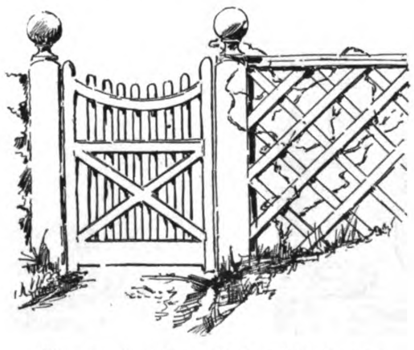


Fig. 9—Another Style of Gateway

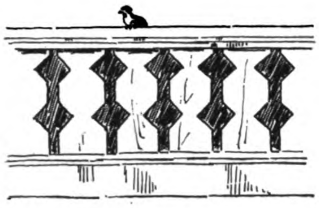


Fig. 10

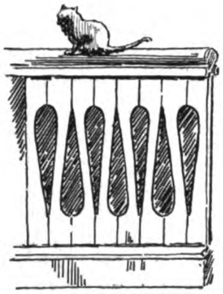


Fig. 11

Fig. 13

Fig. 12

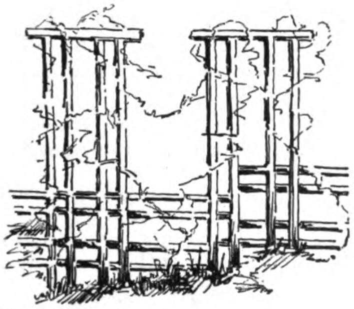


Fig. 14

Fig. 15

Fig. 16

Fig. 17

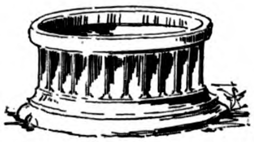


Fig. 18

Fig. 19

Fig. 22

Fig. 20

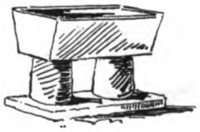


Fig. 21

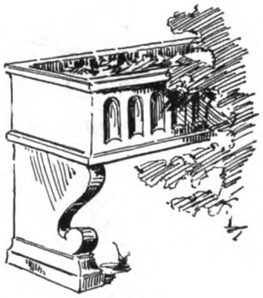


Fig. 25

Fig. 23

Fig. 24

Fig. 28

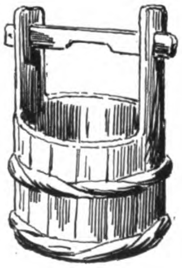


Fig. 27

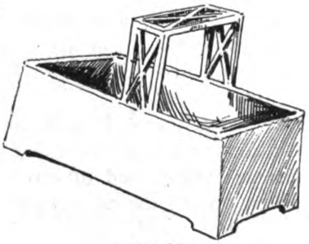


Fig. 26

features, and to certain garden inclosures. Again with restraint and judgment may we, where surroundings seem favorable or the grounds sufficiently extensive, introduce certain features from the Japanese who know so well the quiet pleasures of the garden.

The trivial details and precise disposition of various mythological stone and bric-à-brac should not be a part of our plan, as it is foreign in every way to our thought. Disposal and picturesque arrangement. however, may be studied from the Japanese with great profit. The nature of the vine in its fully developed mid-season luxuriance is anticipated by its location, where its beauty will produce the best effect when it has attained its greatest development. Note the simple tall poles and cross poles in Figs. 13 and 14, located against a crag, hill or even a mound, and picture such arbors entwined with wistaria. Certainly its disposition, in the open, will produce greater beauty to the scene than against a wall.

There will ever be a desire for some formal plant container as a part of the garden plan, even though the set flower bed of circle, crescent, or star has given way to the haphazard edging or ample plot.

While concrete undoubtedly is expressive of dignity and durability, the keg or tub is readily altered to a pleasing outline. The identity of the beer or wine cask is lost when transformed to the shape shown in Fig. 15. The box-like appearance is lost in the construction of Fig. 16 by building with shaped timbered corner posts.

A peculiar fitness was in the box seen at the "Big Trees," California, when made from the bark of the giant *Sequoias*, Fig. 17. Concrete offers a medium for the creation of many beautiful and appropriate forms, some of which are shown, taken from Old English sources, in Figs. 18 and 25, also in Figs. 26 and 27 taken from the Japanese.

The cloister. or chapter baptismal founts, shown in Figs. 19, 20 and 21, are simple shapes of an appropriate stone-like character. Figs. 18, 22 and 24 would, enlarged, make good outlines for a garden pool.

Projecting "timbers" in concrete, of a console form, Fig. 28, permit of a most favorable position for plant boxes. The trellis box in wood, secured to the ceiling beam in Fig. 29, affords a very attractive place for vines, which usually are placed in small baskets.

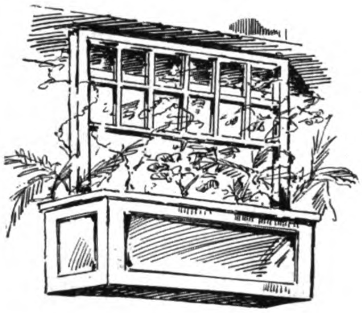


Fig. 29


Fig. 32


Fig. 33


Fig. 30


Fig. 31


Fig. 34


Fig. 35

Various Quaint Designs for Electric Lights and Bird Houses

From the possession of modern comforts of heat, light and power we can be inspired to use, or adapt many features from the Japanese and other sources, which will give rare distinction and convenience about the grounds and dwellings. Figs. 30, 31, 32 and 33 may be put in concrete with little change to the old-time "form," and be provided with wired connection for electric light, so that at will one may

from the house send a welcoming ray on to the lawn or path. Fig. 30 is particularly fitting, located just off the porch, with light opening from one corner only.

What a splendid work the Agricultural Department at Washington is doing, also the schools, magazines and other organizations, for bird preservation. It is decidedly humanizing in its effect, and turning many minds to the overlooked pleasures of outdoor life. Is there a prettier picture to see than a robin on a hot summer morning sousing into a birth bath? Sheer abandonment on the part of the bird, and surely a mental tonic to the onlooker, and a resolve to provide more baths, more boxes and more feeding stations for these worth-while guests of a short season.

Figs. 34 to 39 inclusive possess features more in keeping with the spirit of the garden scheme than do many which are too much after the pattern of a modern "villa"; that is, slick and smooth, and not taking into account a shy mother-bird's instinct and desire for a more natural form of retreat. Houses made of bark are especially appropriate, and Fig. 34 was of a particularly rough-hewn character. Fig. 35, an English keg house, has a charm about the peaked and overhung thatched roof which makes it interesting to look upon, as the little-seen straw bee hive, Figs. 37 and 38, are suggestive of Hungarian roadside shrines. Adaptation from a Japanese lantern is shown in Fig. 36.

Bird baths, Fig. 39, will be found a very simple article to form in cement when embedded in the sod, as most any very large dish pan will do admirably to form the bowl to whatever depth desired. The sod is cut away outside of the pan for two inches or more as an outer diameter for the wall, and the pan held up to give the bottom three or four inches in thickness.

Before "pouring" the cement, an outer containing wall may be set up against the outer diameter by using very heavy pasteboard, or building paper supported and kept in true circular form by sticks pushed in the earth from the outside, and the paper tacked against them. After the cement has fully set, the pan may be removed and the casting allowed to dry under shade.


Fig. 36

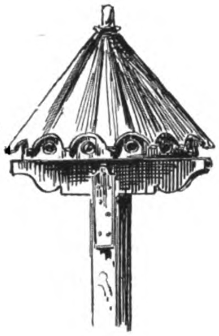


Fig. 37

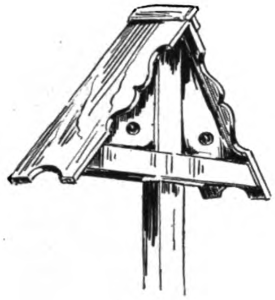


Fig. 38


Fig. 39


Fig. 40

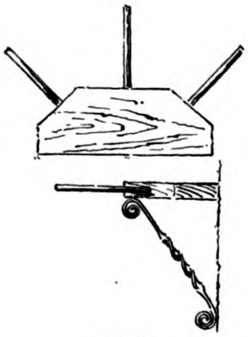


Fig. 41

Miscellaneous Designs for Out-of-Door Furnishings

Certainly it is worth while to sink a well curb for refreshment here, and erect a house pole over there, if it brings before us scenes of joyous fluttering animation and home-building habits.

The Government is reported to have reached a decision that tree-nails or wooden pins used in shipbuilding must be of locust or eucalyptus. The black locust will be the particular species used.

How the Builder Can Get New Business

By Bricksand Mottar

"SAY, Jameson, I reckon you were pretty near right when you said that there was plenty of business for the chap who was willing to go out and work for it. I'm beginning to pull down some nice little jobs at garage building"

Jones had been in the dumps a few months ago when the war started—no house building nor prospect of any sizable jobs at all. Jameson, a traveling man, had come along and shown just how Jones could get plenty of work building private garages.

"You'll find plenty of business coming your way, especially if you advertise a little. Not just your name and address, but some little slogan which will catch the eye and make your name remembered. Say, for instance, 'Tired of paying high garage bills? Build a garage on your own property with ideas that you want in it. If Jones builds it, there'll be no come-back,' or 'Want to rent your house? High-class tenants demand a private garage. Jones is the man to build it for you.' A lot of ideas ought to suggest themselves to you. And you should go to the editor of your local paper and convince him that the new garages you're putting up are *news*. A little write-up occasionally, with perhaps a picture, would interest lots of people. A country newspaper is generally hard up for real news and the editor ought to see the value of what you are suggesting to him."

"Say, that's rather interesting. I never thought of trying to get in the news columns. But do you think the editor will fall for it?"

"Sure, especially if you advertise. And what I'm going to show you now will fit in with the same advertising scheme. Work the free publicity for all it's worth.

"One of the things I suggest is that you try to get a few jobs fixing up rooms with wallboard. You'll find it won't be a hard job to sell the stuff if you get hold of the right people."

"That sounds good," said Jones. "But how am I going to get hold of the right people?"

"Ask me something hard," laughed the salesman. "This one-horse town of yours has a daily newspaper. Plenty of fires occur, and these are all played up by the paper. Now, all you've got to do is to watch out for fires. When a place is slightly damaged so that really nothing more is necessary than a few minor structural repairs, new plastering, etc., why there's a fine prospect, not only for wallboard but for lots of other work."

"Watson had a fire this morning," suggested Jones.

"Let's try him then," and Jameson went off with Jones to try to make the first sale.

"Mr. Watson," said Jameson, as the two aspirants entered the prospect's office, "that was a pretty bad fire you had in your place this morning."

Have you ever thought of going right after an owner as soon as a fire occurred in his place? He's a dandy prospect, for he's got money tied up in a building which is no good until repaired. Why should you sit around and wait for him to decide on some other builder to do the work? Architects generally take advantage of fires, especially in industrial buildings. But builders in small towns often seem to let such opportunities slide by.

"Yep. Lucky it wasn't any worse. What do *you* want?" Naturally, Watson wasn't any too pleasant after having had his place burned.

"I want to save you some money in repairing the place. Of course, you're not going to let the money you've invested in the house stand idle. There's too big a demand for houses now.

"If you plaster your rooms, you're going to have a lot of trouble and delay. You'll have your place idle for sometime while waiting for the plaster to dry out, and you will spend quite a bit of cash in this weather to keep the place heated up so the plaster will dry out.

"Now I can save you that time needed for plaster drying. Too much trouble to get coal now for you to heat up by furnace, so you probably will have to use salamanders.

"Now suppose you use wallboard. Here's a sample, Mr. Watson," and Jameson handed it over to Watson.

"What do you think of it?" inquired Jameson.

"It looks pretty good," admitted Watson grudgingly.

"Now we can fix that up in some distinctive panel treatment. The panels can have the jointing cracks covered up with battens or the wallboard can be set into molding made especially for the purpose. The cost is about the same."

"But I don't know as I would want panels," objected Watson.

"Then all you have to do is paper straight over the wallboard. Here are some pictures of rooms that have been fitted up with wallboard."

Watson looked the pictures over slowly. Almost every man is interested in looking at pictures and a few illustrations to make the points of the talk will help clinch a sale very much.

"Mr. Jones here, who I reckon you've heard of as a pretty reliable builder, can go over with you to the house and give you an estimate of how much it will cost to fix up with wallboard. Then you can get somebody to figure on doing a plastering job. I reckon you'll find out that it will be best to use the wallboard all right. Suppose we all go over now? I guess you're pretty anxious to find out if you can save money on the repairing, aren't you?"

"I surely am, young man," and Wat-

That Was a Pretty Bad Fire You Had in Your Place This Morning

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Editor's Note—This is the second article of this series. The first appeared in the issue of November, 1917. The third will appear in an early issue.

son put on his hat and coat and took the two men over to the burned house.

Having gotten Watson this far, it was not such a hard job to close the contract and, as Jones got the wallboard contract, it was only natural that he should get the other work which had to be done.

Jameson worked out his sales plan this way. He knew that Watson would be most interested in something that he could readily understand. He showed him how in this particular case the appearance of the damaged rooms could be made attractive at a less expense than any other way, and he used pictures of finished rooms so that Watson could see for himself just how the completed job would look.

Have you ever thought of going right after an owner as soon as a fire occurred in his place? He's a dandy prospect, for he's got money tied up in a place which is no good until repaired. Why should you sit around and wait for him to decide on some other builder to do the work? Architects generally take advantage of fires, especially in industrial buildings. But builders in small towns seem to let such opportunities slide by.

Jameson knew from experience that in every town there are plenty of building jobs waiting to be done, but which need a little directing of energy to induce the owners to stop putting off the work.

There Are Plenty of Ways for You to Get New Business

"Mr. Jones," said Jameson, after the deal was settled with Watson, "the thing to do now is to let your local paper know that Watson is going to put his place in shape immediately and that you are going to do the work. That's your first chance for free publicity to-day.

"Now, there are a couple of more things I want to talk to you about before I have to take my train. Try to get a few jobs putting ⅜-in. flooring over old floors. You can probably scare up a few prospects from your memory. Then tackle them. Show how rich a hardwood floor will make a room look. Show him how much easier it can be kept clean and the doing away with carpet. Quote the cost.

"Then there are opportunities to put in new doors, although that's really the lumber dealer's end. But if he's not wideawake, you might just as well sell a few and hang them.

"You can knock down a few extra jobs weather stripping houses. Show how it saves coal and prevents drafts around windows and doors.

"These are just hints. There is plenty more work of this comparatively inexpensive nature which you can do and which people will readily pay for even under present conditions. Always quote prices so that your prospect will know just how much the job is going to cost. And don't overlook the big helps that manufacturers will be only too glad to give you.

"Do you think these ideas are worth trying?"

"You just bet I do."

"It means work, of course. But conditions just now are such that you've got to work hard to get new business. It can be gotten by the chap with brains and energy, all right, and I hope you'll make good on this. I'll show you some more pretty soon if I get time."

How Doors Should Be Hung for Correct Swing

By E. J. G. Phillips*

It is not at all uncommon to find doorways in houses arranged or located so that one door when opened will either altogether or partially obstruct another doorway. In such cases one of the conflicting doors is always out of service when the other is being used. Aside from the inconvenience of such an arrangement, swinging doors always present the possibilty of scratching, marring or otherwise damaging the doors by bumping one into the other. These unfortunate interferences seem to occur most frequently in cases where one of the doors opens into a clothes closet, but they are by no means limited to such instances of comparatively minor importance.

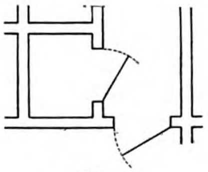

Fig. 1

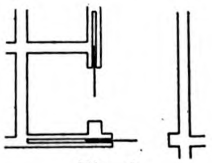

Fig. 2

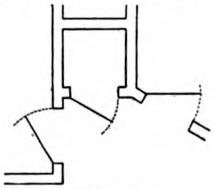

Fig. 3

Fig. 4

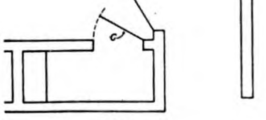

Fig. 5

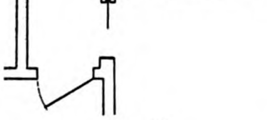

Fig. 6

Sometimes doors are not located most advantageously because too little thought is given to the subject when making the plans. The responsibility is then entirely with the designer. There are also a good many cases where it would be impossible to change the position of the doorway without seriously affecting the general plan. In such instances it is often possible to materially reduce or entirely eliminate the interference by using a type of door particularly adapted to the case.

It is the purpose of this article to present a few suggestions along this line showing how certain types of doors may

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*Chief Engineer Richards-Wilcox Mfg. Co.

be effectively substituted for others. The accompanying illustrations are partial reproductions of actual building plans together with suggested revisions.

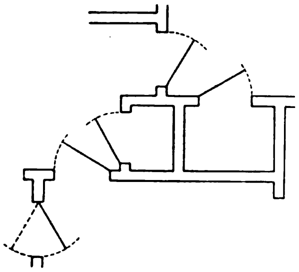


Fig. 7

A very common illustration is given in Fig. 1. Notice that the doors could not be located in any other place without changing the plan of the rooms considerably. The inconvenience might have been avoided entirely by using two sliding doors as in Fig. 2, instead of the swinging doors. Either door can be opened without interfering with the other door.

A similar condition, shown in Fig. 3, cannot be remedied by substituting two sliding doors because of insufficient space in which to slide one of the doors. The suggestion here is to use a sliding door entering the larger room and a pair of narrow folding doors for the closet, as in Fig. 4. The folding doors are so narrow that very little of the sliding door opening will be obstructed. A very small door hanger attached to the top of the forward corner of one door at "A" and sliding in the track overhead serves to guide and support the doors on the side opposite the hinges. A cremone bolt attached at "B" is used to lock the doors.

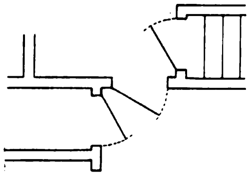


Fig. 11

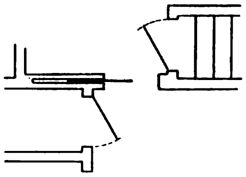


Fig. 12

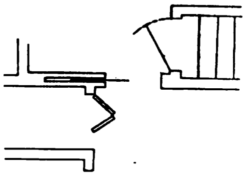


Fig. 13

The plan, Fig. 5, where two doors open towards each other, is decidedly objectionable and seems to be a case of poor judgment. A change in the location of the closet door "C" from its position at the left end of the closet to a place at the right end of the closet would eliminate all interference. If it is desirable to maintain the positions of the doors on account of the arrangement of furniture or other reasons, two sliding doors as in Fig. 6 should be used. Frequently it is only necessary to build a very short double partition for the sliding door. Inspection of the plan, Fig. 6, as well as the other plans will reveal this clearly.

A double set of interferences occur in the plan, Fig. 7, all of which may be avoided by using three sliding doors and one pair of folding doors as suggested in Fig. 8.

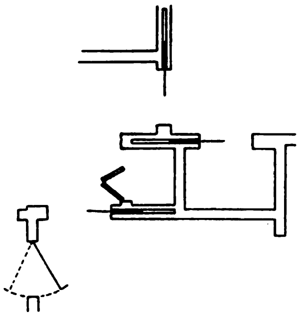


Fig. 8

The two pairs of opposing doors adjoining a central stairway in Fig. 9 might be improved by swinging the doors D D into the opposite room, but the trouble could be entirely overcome by the use of four sliding doors as indicated in the plan, Fig. 10.

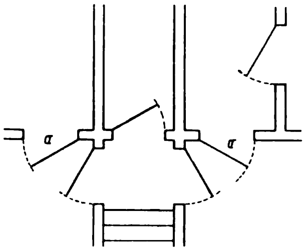


Fig. 9

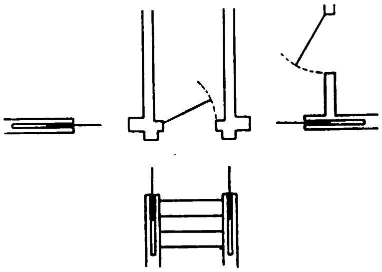


Fig. 10

A combination of three door interference which is particularly difficult to overcome is presented in the plan, Fig. 11. The use of one sliding door as in Fig. 12 is an improvement in that it prevents the doors from being bumped together. A still better plan would be to use one sliding door to enter the bedroom and one pair of folding doors to the closet as in Fig. 13. The stairway shown leading to the attic would not be used very often, and for that reason does not present such a serious objection.

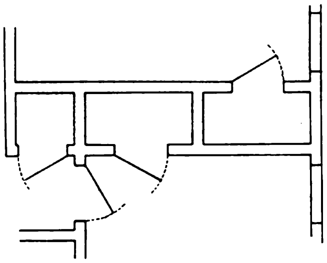


Fig. 14

A particularly bad case of three doors so arranged as to obstruct each other when in use is shown in Fig. 14. The correction for this is less easily excused because of the simple manner in which it might be overcome, as illustrated in the plan Fig. 15, where the substitution of three sliding doors is the only requirement. The change could be made with a small extra expense which would be compensated for by the added convenience.

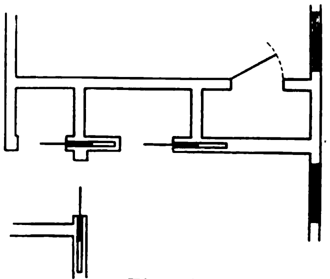


Fig. 15

The plans shown are typical and have been selected from a large number of similar ones. The correction of the interferences depends almost altogether upon the substitution of sliding doors. The use of the sliding house door has been confined almost altogether to large openings, but a more complete appreciation of the value of this type of door for small openings will lead to better designed and more convenient homes, in respect to the detail of doorways.

REPAIRING BRICK CHIMNEY

An old brick chimney was so badly weathered that a large quantity of mortar had fallen out of the joints, and much of the brick was eaten away. The chimney was repaired by thoroughly cleaning the exterior surface, removing the loose mortar and soft brick, and enclosing it with No. 28 A-1 triangular mesh furred out 1 in. from the original brick surface.

The metal fabric was then enclosed in concrete with a minimum thickness of 2 in. that was shot into place with a pressure of about 50 lb. per square inch.

A Stucco Coated Cottage

STUCCO as a building material carries a wide appeal, and the walls of the house under description are covered with this popular material, while shingles form the covering of the roofs and the sides of the sleeping balcony. The exterior lines present a long slope in front broken by the provision for the sleeping balcony. The rear slope is shorter, and the ridge is slightly hipped at each end. At each side of the porch is a group of three columns which serve as supporting members for the overhang roof, each of the two groups having its several members connected by lattice work. The same idea of column grouping is carried out in the design of the small porch. In examining the windows it will be noticed that the upper sash in the second story have triangular shaped divisions, whereas the upper sash in the lower stories are divided rectangularly.

Entrance to the main part of the house is had from either one of two porches, both of which communicate directly with the living room. The main feature of the living room is a fireplace. The dining room is reached from the living room through a wide opening, and it contains a large window. Communication with the kitchen is through a pantry, which contains a sink placed under a window so that it is afforded plenty of light. The kitchen sink is also advantageously placed in this manner. The kitchen may be entered from the outside porch by means of an entry which contains the refrigerator and the back stairs. The cellar stairs go down under the main flight, thus economizing stair space. The main stairs are contained in one end of the living room and the arrangement of the landing is worthy of notice. The second story contains four bedrooms, a bath, and a sleeping balcony, which is placed over the front porch. There is a narrow balcony at the opposite end of the house. The hall is so placed as to serve its communicating purpose with a minimum of waste space.

The foundation walls are of stone. The cellar floor is of cement, the mixture used consisting of one part cement to three parts of sand and gravel.

The wood used for framing was spruce and hard pine. Outside studs were 2 x 4 in., and inside studs used in bearing partitions were 3 x 4 in.; plates are of 2 x 4 in. stuff doubled; rafters are 2 x 6 in.; joists are 2 x 9 in.

The sheathing is of ⅞ in. North Carolina pine, over which was placed black Neponset building paper, this in turn receiving galvanized Herringbone lath. To this stucco was applied. The proportions of the scratch coat consisted of one bbl. of Portland cement, ½ bbl. of lime putty, 3 bbl. of sand, and one bu. of cattle hair; the proportions of the brown coat consisted of one bbl. of cement, ¼ bbl. lime putty, 3 bbl. of sand and one bu. of cattle hair; the proportions of the finish coat consisted of equal parts of Portland cement and sand, to which was added a small amount of lime putty. The exterior trim was given three coats of lead and oil.

The floors throughout are double. The sub-floor consists of ⅞ in. North Carolina pine. Over this was placed a heavy building felt, which received the finished floor of rift Alabama pine. At completion the floors were given one coat of filler, two coats of shellac, and one coat of Butcher's polish.

The trim is of North Carolina pine, stained and finished natural. The exterior doors are of pine 1¾ in. thick, and the interior doors are of birch 1½ in. thick; doors in the service portion are of fir. Windows are of both the double hung and casement types, the sash being of pine 1½ in. thick.

The risers and treads are both ⅞ in. thick, the risers being 7½ in. and the

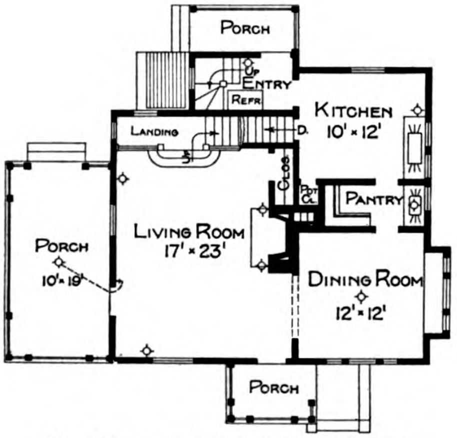
Cottage of Miss Elizabeth Cardozo at Shippan Point, Stamford, Conn.—Architect Edward B. Stratton

treads 9½ in., all dadoed into the skirt-board.

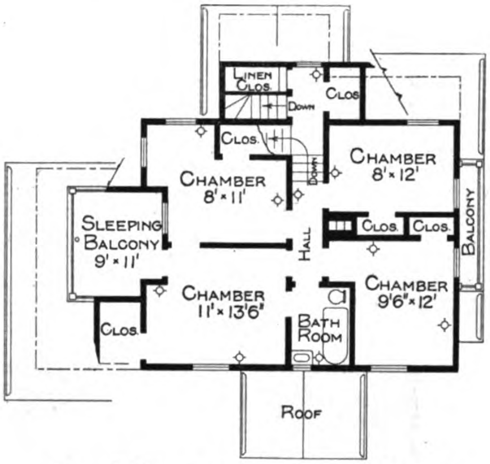
The plastering is two coat work, smooth finish. The ceilings in the first and second stories are tinted in water color. The walls in service portion are painted with three coats of lead and oil.

The various plumbing fixtures are of vitreous earthenware and enameled iron, and were manufactured by the Standard Sanitary Mfg. Co. Lighting is by means of electricity.

This house is located at Shippan Point, Stamford, Conn., and was constructed for Miss Elizabeth Cardozo in accordance with plans and specifications prepared by Architect Edward B. Stratton, 150 Devonshire St., Boston, Mass. Its cost as built some three years ago is stated by the architect to have been $3,477.



First Floor—Scale 1/16 In. to the Foot



Second Floor—Scale 1/16 In. to the Foot

READING BOARD MEASURE WITH THE STEEL SQUARE

One of the handy uses to which a steel square may be put is in the reading of board measure, and the carpenter who likes to use his square for everything may be interested in this "kink."

Take a long-bladed bevel and apply it to the square, the end nearest the screw passing through the number 12 on the tongue of the square. The bevel always passes through the tongue at the number 12 no matter what the dimensions of the board may be.

Now move the bevel until it registers the length of the board in feet on the body of the square, the bevel blade still intersecting 12 on the tongue of the square.

Now move the bevel to the number on the tongue of the square which corresponds to the width of the board in inches, but care must be exercised to keep the bevel parallel to its original position. Read the number on the body of the square through which the bevel passes; this number is the board measure for a board of the required length and width, but with a thickness of 1 in. To find any required thickness, this number is multiplied by the thickness of the board in inches, which gives the result.

For example, to find the board measure of a stick 16 ft. long, 7 in. wide, and 1 in. thick, the first thing to do is to set the bevel at 12 on the tongue (the invariable number) and 16 on the blade (the length of stick). Then move the bevel up to 7 on the tongue (the width of stick) and read the number indicated by the bevel on the blade of the square, which is 9 4/12, or 9 ft. 4 in. This result is then multiplied by the thickness of the board in inches. In a board 1 in. thick, 9 ft. 4 in. or 9 1/3 × 1 equals 9 1/3 B.M. With a board 2 in. thick, 9 1/3 × 2 equals 18 2/3, or 18 ft. 8 in. Boards less than 1 in. thick are considered as 1 in. thick in measuring, but certain sizes or grades of fractional inch size sometimes carry a reduced price.

By using mathematics, the same result can be obtained by multiplying the thickness times the width (both in inches) and dividing the result by 12, this answer is then multiplied by the length in feet, which gives the board measure.

CORRESPONDENCE COURSE IN LUMBER

The School of Forestry, University of Idaho, is announcing a correspondence study course in "Lumber and Its Uses." The course has been prepared by a specialist in the subject and is designed to be of special value to lumber dealers, lumber salesmen, contractors, or builders, architects, carpenters, manual training teachers, and others connected with the wood-working industries.

The course consists of twelve assignments, including the structure of wood, the physical properties of wood, standard grades and sizes, structural timbers, seasoning and preservation of wood, paints and stains, lumber prices, cost of wood construction, war time and other specific uses of woods, and selection of materials.

Of vital importance now is the war time uses of wood, and especially for ships, cantonments, aeroplanes, gun stocks, etc.

QUEER SUPPORT FOR A FLAG POLE

Weird and strange things are often done by contractors who have not fully realized the responsibility which their position entails. Very often, either through ignorance or sheer carelessness, constructive features that are decidedly dangerous are incorporated in a building. Most of us are familiar with the man who supports his floor joists by the chimney, thus causing grave danger from fire. But probably few builders have ever seen anything like that shown in the accompanying illustration. An examination of the picture shows that the flag pole is framed back through the chimney, which forms the main support for it. Pieces of wrought iron help support it as shown. A wire extends from the top of the flag pole to the chimney, thus making sure that the latter will take most of the strain. It doesn't require much imagination to realize how that chimney is being strained and how certain the mortar joints are to open, especially considering the poor quality of mortar which was probably used. This is a most excellent example of how *not* to do a thing.

DEPARTMENT OF MASONRY CONSTRUCTION

CONCRETE
BRICK
ETC

PRACTICAL
IDEAS WHICH WILL
HELP YOU TO DO A
QUICKER AND BETTER JOB

STONE FOUNDATIONS

By Charles King

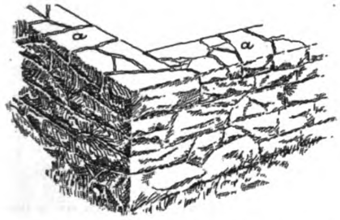


Fig. 1—Random Coursed Rubble

STONE masonry of today is not essentially different from that of ancient times, as much of the work is still done by hand. The trowel, the stone hammer, the chisel and many other tools are essentially the same as those used in the building of King Solomon's temple. Usually the stone work of ancient buildings was of either "random-coursed" rubble, Fig. 1, or "regular coursed" rubble, Fig. 2, which are still the most common forms of stone masonry used in building foundations. They are both built now as then of either quarried or field stone with undressed faces. The former is generally used, as stones of more rectangular shape may be obtained than if field stones are used, and are better for stone work because their faces are sharper and form a better hold for the cement than the weather worn and smoother surfaces of field stone. However, field stones, beach or cobble stone are much used in building rural and seashore houses, sometimes as a veneer underpinning upon a rubble backing as in Fig. 3. A wire bond similar to that indicated at "a" being set in the cement of the wall and the veneer to hold the latter firmly in place.

Many foundations and underpinnings have been built of "cobweb" rubble, Fig. 4, which is especially adapted for use in building suburban and country residences; if the joints are skillfully made and mortar shows about the same in all places, an attractive and serviceable wall will result.

Hard limestone or sandstone make excellent foundations excepting in very wet locations. As these stones are stratified and are formed in the ledge of different thicknesses, each of which is uniform throughout the entire ledge, they are easily quarried and may be readily trimmed so that each stone will extend through the wall. As all joints may be either lever or plumb, the stones may be laid more easily than any other kind.

A stone of this sort should be placed upon its natural bed; that is, as it laid in the ledge. This can be found by determining the layers which form the stone. If these are placed horizontally they will give no trouble. If placed vertically and rain penetrates the stone and is followed by extremely cold weather the face layers may peel off. This is not true of either granite of dendrite, which are much harder to cut and shape but are impervious to water. A good building stone should respond to a sharp blow with a hammer by a ringing sound, and its fracture should be clean and sharp. If soaked in water over night its weight should not increase more than four per cent. Soft sandstone will absorb more water, but the ease with which it may be worked makes it a favorite building stone wherever it can be obtained locally.

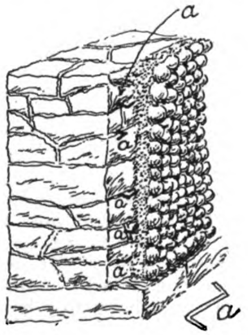


Fig. 3—Cobble Stone Veneer

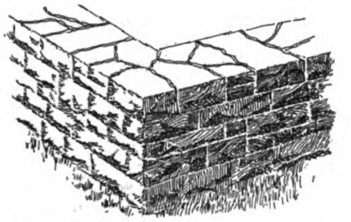


Fig. 2—Regular Coursed Rubble

A rubble wall should be built double and not less than eighteen inches thick unless sandstone is used. Each stone should extend through the wall, in which case twelve inches is thick enough for an ordinary dwelling. The bottom or footing course should be laid of the largest, straightest stones, as the stability of the wall depends largely upon the bearing of the stones on the ground.

The stone mason should hammer dress inequalities which prevent the stone from facing up with the rest of the wall, or interferes with bedding it or in fitting the next course. Often instead of doing this, "spalls" or pieces broken off in trimming are slipped under stones which do not rest firmly, as this is easier than the laborious turning, trimming and replacing of the stone and is also a more popular method among stone masons. While contrary to the best practice, if spalls are judiciously placed and set in mortar so

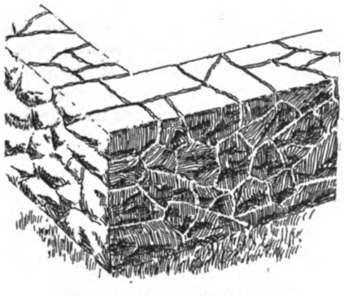


Fig. 4—Cobweb Rubble

that they support the stone sufficiently and cannot move, they simplify the construction of a rubble wall, and will be satisfactory for ordinary buildings. Spalls should not be used in heavy construction excepting in filling the cavities in the center of the wall.

Placing Bond Stones to Resist Strain

Bond stones, "a" Fig. 1, should extend through the wall not more than three or four feet apart; these should be hammer dressed so they will coincide with the face upon each side of the wall. The corners must be built of large stones which will bond the two adjoining walls together to resist any strain they may experience. In addition to the bond stones a galvanized-iron or wire bond may be laid in the mortar. This will add much to the strength of the wall, especially if small stones are used.

Hints on Mixing Mortar

A skilled stone mason endeavors to finish each course of rubble work as nearly level as the shape of the stones will permit, unless he has stones in view to fit certain angles, and which are of such form that they will not slip after they have been laid. Three cornered stones are the pet aversion of the mason, and are usually discarded if they cannot be used as fillers in places where they carry little or no weight. A stone covered with dry or loose earth should be brushed or washed clean before mortar is applied to its surface, as the earth will absorb the moisture of the mortar and prevent its contact with the surface of the stone.

The thin edge of the stone should not be allowed to support any weight, as it may break off. A long stone should be bedded in mortar so it will bear uniformly; if it is too long it may be wise to break it and lay it as two stones.

The presence of continuous joints through several courses of stones as at "a," "b" and "c" of Fig. 5, are evidences of unskillful workmanship, as the bond is not good. A defect of this sort may permit the wall to collapse if there is any settling or unusual lateral strain. The defect of placing one stone upon one stone instead of upon two stones is shown in the same sketch.

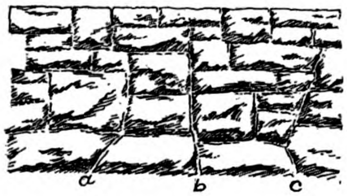


Fig. 5—A Poorly Built Wall

The top of the wall should be of good sized stones carefully trimmed so the inside and outside corners will be in correct relation with the line to which the wall is laid. The top should be levelled smooth to receive the underpinning, the above ground mason work or the wood sill.

While the outside of the underground wall need not be laid with as much care as the side which will be seen, there should be no projecting stones with slanting tops to catch the water in the soil, or which runs down the outside of the house and conduct it into the middle of the wall or into the cellar as at "a" in Fig. 6. A ledge in the ground should never be made a part of the cellar wall, but should be cut back far enough to insure a space between it and the outside of the wall, or water will find its way into the cellar through minute cracks in the rock.

In mixing mortar it is customary to use sand and lime in the proportion of one of lime to four or five of sand according to the quality of the lime and the coarseness, cleanness and sharpness of the sand. Very fine sand will require more lime than coarse sand to make the same amount of mortar. To test sand, squeeze a handful of damp sand, and if it falls apart when the pressure is removed it is suitable for use, but if it retains its shape it should not be used for mortar as there is too much foreign matter in it for use with either lime or cement.

The lime and sand should be thoroughly mixed into a thick paste and allowed to stand over night to ripen, after which it is "tempered" by adding sand and water as the mortar is used. Mortar of the right consistency should hold together when allowed to "bag" over the edge of the trowel. The wall should be laid in Portland cement if the strongest possible job is desired. Even upon common work it is wise to add about one part of cement to three or four parts of lime mortar as it is used. This combination adds much to the strength of the wall, as cement becomes harder and adheres better to the stone than does lime mortar alone. It also makes the mortar set more quickly and is not so affected by water; if a frosty night happens before the mortar has thoroughly hardened, it is not likely to do much damage. In using cement, about one part hydrated lime to eight of cement may be added as the cement will work more easily without sacrificing any strength.

Upon the best class of work the mortar is spread, and the stone forced to its bed and into perfect alignment with the face of the wall. Care should be used to see that the stones never touch each other, being separated by mortar.

Upon ordinary foundations it is the usual custom to lay the entire wall dry and afterward fill the joints of each side of the wall with mortar. This is called "pointing," and walls laid by this method before the memory of man are standing today. A strong and economical wall may be built by laying each course and thoroughly pointing it upon both sides. The interior of the wall is then filled with a thin mortar or "grout" and spalls pressed in to fill the cavities.

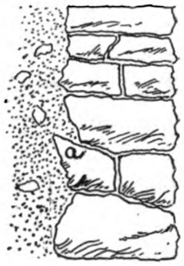


Fig. 6—Poor Construction

Usually the part of the cellar wall which can be seen only from the inside is laid of stones from the size of a man's head to as large as can be handled. It should be built of the kind of stone most easily available, as the stone masons of each locality can more easily build a satisfactory and economical wall of the stones with which they have been accustomed to work.

The Secret of a Serviceable Rubble Wall

The stability of a rubble wall depends upon the willingness of the stone mason to apply an axiom of his craft, "No matter what the size or shape of the space to be filled, there is somewhere a stone to fill it." If the mason decides it will be wiser to trim a stone to fit the place than to spend the time necessary to find a stone which will just fit, the use of the hammer and chisel will trim corners off here and there. A stone which to the unpractised eye appears hopeless will slip into its place easily.

A well laid rubble wall should give the impression that its face is straight; small depressions or projections of the faces of single stones should not be considered. If several stones are so laid that there is a distinct depression or projected area in an otherwise straight wall, it is evidence of poor workmanship. If joints are not of uniform width or if too much mortar shows upon the face of the wall it is evidence that the mason slighted the fitting of the stone. As stone is stronger than mortar, the greater the proportion of well fitted stone the better the wall.

How House Chimneys Should Be Constructed

By Ernest Drah

Methods of Construction That Will Result in a Safe Job Free from Fire Hazard

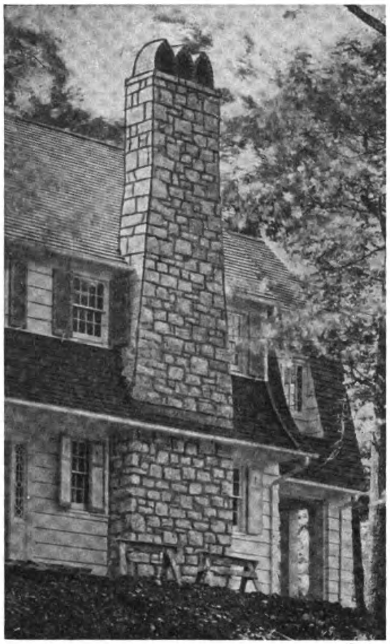
Details in Flue Design Which Will Insure an Economical Heating System

ON the correct proportioning of the flue for the heating apparatus and the proper construction of the chimney depend largely the comfort and safety of a house. Flue and chimney depend greatly one on the other, for a properly designed flue housed in a poorly constructed chimney will leak and contribute to discomfort and fire hazard, while a badly proportioned flue in a well built chimney, although structurally safe, will give considerable discomfort to the occupants of the house.

Certain facts of construction and design have been established through the experience of heating contractors and builders. Successful operation of equipment depends upon these points, and the builder must necessarily thoroughly understand this very important part of his business.

A proper foundation is necessary if the chimney is to remain plumb and true and this should start below the frost line, being 6 or 8 in. larger all around than the dimensions of the chimney proper, and at least 8 in. deep. The nature of the soil governs the proper proportions of the chimney footing. The footing should, as a general rule, be either stepped down or inclined at an angle so that the base of the footing will be larger than the top. Sometimes in cheap construction, when the only stove in the building is located on the second floor, the chimney is supported on wooden beams, but this practice is a dangerous one, for the unstable foundation is sooner or later liable to open up cracks in the chimney, from which sparks will escape.

The sides and joints of the chimney should be as smooth as possible and the chimney should be carried up straight and be of uniform thickness. Sometimes careless design renders it necessary to carry a chimney over a few inches to avoid a beam or to bring the chimney out at a certain place in the roof. This deflection should be not more than 6 in. and the corbelling should be done in at least five courses of brick. Chimney deflection such as this should not be necessary if the design and constructive details are logically worked out. Where the bend occurs mortar dropped by the mason will collect, Fig. 1, as will soot and other dirt, thus reducing the flue area at this point. Bends also restrict the draft. The flue should be kept clean after being built, as accumulation of soot is a frequent cause of fires, especially when the construction is poor. Some foreign cities by law require chimneys to be kept clean.


A Style of Chimney Top Claimed to Prevent Down Draft

Minimum Thickness of House Chimney Walls

The walls of a house chimney should not be less than 8 in. thick if unlined. If the chimney is very large or if it is an outside one, 12 in. or more is advisable. If the flue is provided with a properly set fire clay flue lining a chimney wall thickness of 4 in. is permissible, but this thickness is not advisable from the standpoint of strong or safe construction. Stone chimneys should have walls at least 4 in. thicker than brick chimneys of corresponding size and the stone should be carefully dressed so as to have smooth sides, except on the face where roughness aids the appearance. The thickness of flue partitions should be at least 4 in. thick, this being the size advocated by the National Fire Protection Association. These flue partitions should be well bonded into the main chimney walls.

When two flues are built into the one chimney and are provided with flue lining, it is permissible to allow the partition between them to consist merely of the linings, thus doing away with a brick partition. The adjoining flue tiles should be set so as to break joints with each other. If more than two flues are to be built in the one chimney, 4-in. partitions should be built so that not more than two flue linings will be placed in one brick flue, thus avoiding excessive cooling of the gases of the middle flue if both the others were not used at the same time, and also to give proper strength to the chimney.

Theory of Chimney Draft

The theory of chimney draft is, simply stated, as follows: The material burned in a furnace or fireplace emits gases of a high temperature which, as they are lighter than the air outside of the furnace and which is being supplied for purposes of combustion, tend to rise. The higher the temperature of the gases, the greater the difference in temperature between the chimny gases and the outside air—consequently, the greater the difference in pressure, thus increasing the velocity of the gases. To promote a strong draft, it is necessary to keep this temperature difference as great as possible. Consequently, the flue construction must be such as to retain the heat and velocity of the gases as much as possible. If the flue is too small, the gases will be unable to rise with proper ease, and if it is made too large, the warm air from the fire will be insufficient to heat the flue and the velocity of the gases generated by the fire will therefore be too small to prevent down draft. The rising gases will also find difficulty in forcing their way against the heavy, cold air and the fireplace will smoke until the flue is sufficiently heated to permit of proper velocity of the gases. This is the reason why many fireplaces smoke when first started in autumn.

Proper Chimney Height

A chimney should be at least 25 ft. high. The most usual method of improving a poor draft is to increase the height of the chimney. Whatever the height of the chimney may be, the best practice

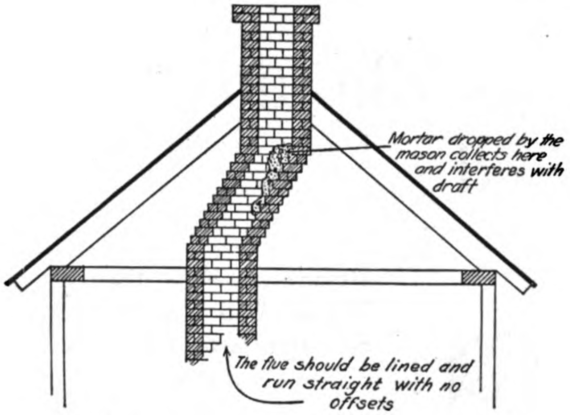


Fig. 1—Section Through Chimney Showing the Bad Effects of Offsets in Restricting Flue Area

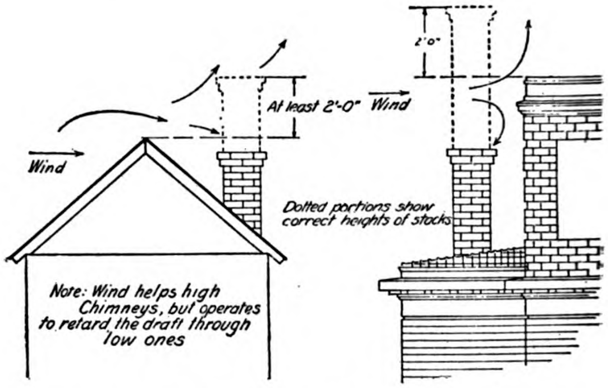


Fig. 2—This Illustration Shows the Action of Wind on a Chimney

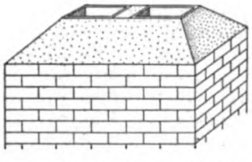


Fig. 3—A Cement Cap Sloping Away from the Flue

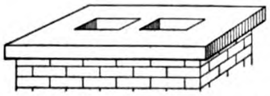


Fig. 4—A Stone Cap Is Often Placed Over a Chimney

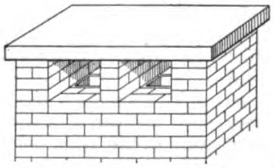


Fig. 5—This Is a Top Often Used in New York City and Is Claimed to Prevent Down Drafts

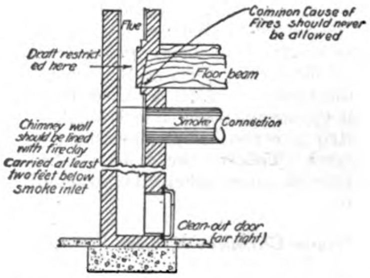
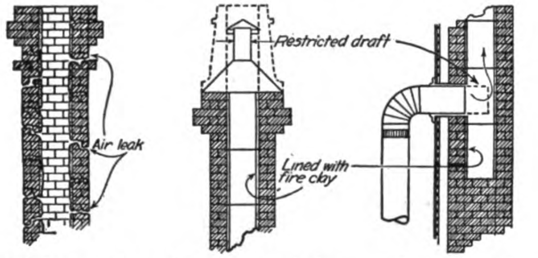


Fig. 6—A Clean-out Door, Set in Mortar and Carefully Fitted, Should Be Installed at the Base of the Chimney

advocates carrying it at least 2 ft. above the highest part of the roof, so as to avoid conflicting air currents which would be liable to cause down draft. The action of the wind on a chimney top is shown in Fig. 2.

When two or more chimneys are located in the same house, their height should be kept equal, especially if they are located so close together that air currents will pass through the building from one to the other, as there is a tendency for one to draw part of its air supply down through the other.



Defective or broken mortar joints admit Air and check draft

Improper cap restricts draft Flue should run full size as shown by dotted lines

Smoke pipe must not project into flue as shown by dotted lines

Fig. 8—Details to Guard Against

Chimneys should be capped to prevent rain from working down between the joints of the brick work, which tends to destroy the bond. The construction of the chimney top affects the draft in various ways. One writer holds that the draft is improved if the top slopes away from the flue at an angle of about 45 deg., as shown in Fig. 3. With this design the rain will flow away from instead of toward the flue opening. A more usual method is to provide a bluestone cap about 3 in. thick with holes in it which correspond to the flue openings, as shown in Fig. 4. Such holes in the stone should be the exact size of the flue.

Sometimes a stone is laid over the chimney, as shown in Fig. 5. This is claimed to keep out rain and to prevent down drafts. The slab should be at least 7 in. above the chimney, or the height can be made to equal the diameter or greater dimension of the flue, if it is rectangular. This method is widely used in New York City, where tall buildings produce downcurrents which tend to interfere with the chimneys of their shorter neighbors, and seems to give entire satisfaction. A similar idea, but of more architectural excellence, is shown in the accompanying halftone herewith. This also shows how the wrought iron ornament often placed on a chimney can be fastened to it by an iron pipe (shown at that part of the chimney just above the main cornice), which is built into the chimney wall, the ornament being later fastened to this.

Another style of top gaining in favor

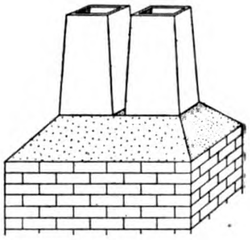


Fig. 7—A Design of Chimney Top Which Is Increasing in Popularity

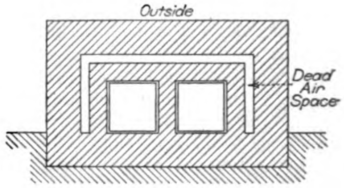


Fig. 9—How an Outside Chimney May Be Built in a Cold Climate

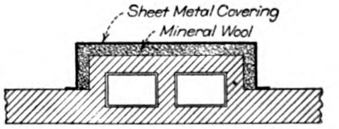


Fig. 10—A Method of Warming a Cold Flue

is shown in Fig. 7, in which the flue linings project an arbitrary distance above the chimney, the top sloping as in Fig. 3.

Wide corbelling at the top of a chimney is very liable to cause splitting. The writer recently noticed a fairly extensive area which contained a number of chimneys with widely corbelled fancy tops, and every one of them had split, whereas their plainer brethren stood unharmed by the severity of climatic changes.

A chimney should not be enlarged where it passes through the roof, especially if it laps over the roof boards, as cracks are almost certain to occur at this point in such a construction, due to the greater settlement of the chimneys, which would cause the brickwork to press against the roof boards thus lifting the upper bricks and causing cracks. Neither should its area be restricted at this point by sheet metal contrivances, which check the draft, Fig. 8. Smoke pipes should not be allowed to project into the flue, as this restricts the draft.

In extremely cold climates, the exposed sides of an outside chimney can be insulated by a dead-air space, as shown in Fig. 9. This also helps to prevent the chimney from cracking due to extreme heat inside and extreme cold outside.

Another less expensive way to protect a flue from a cold exposure is to insulate it on the outside by a sheet-metal covering with a sufficient space left for 2 or 3 in. of mineral wool or similar material, as shown in Fig. 10. This can be done on a brick building by using imitation brick of pressed steel siding painted to resemble brick and mortar, or by using plain galvanized sheets painted.

(To be continued)

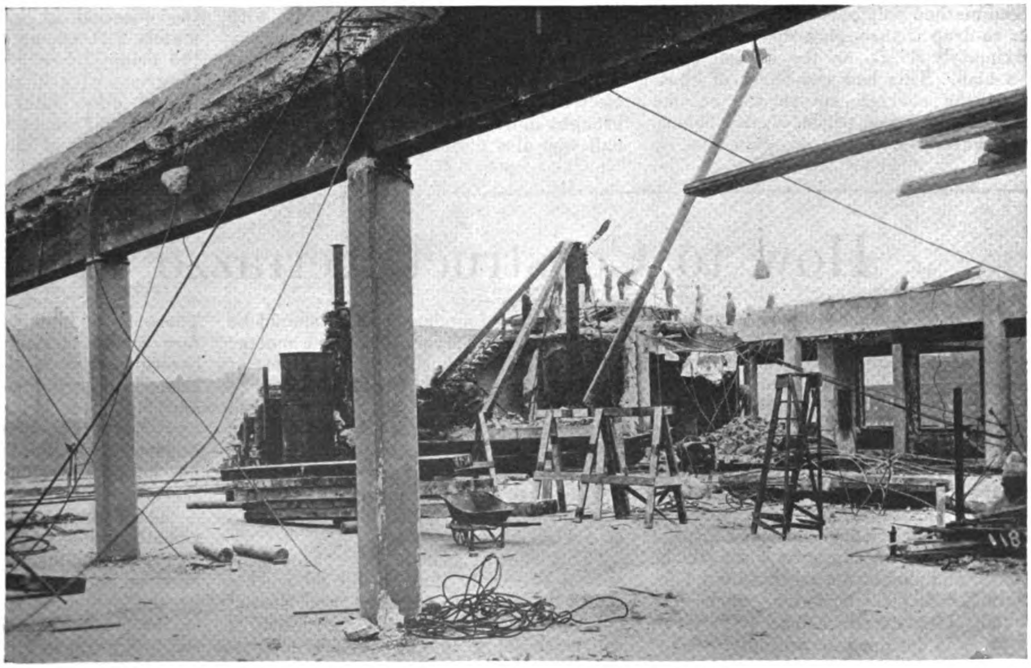
Using a Heavy Iron Ball to Wreck a Concrete Building

By Robert H. Moulton

The Iron Ball Makes a Clean Hole in the Floor

POUNDING a reinforced concrete building to pieces with a 1200 lb. iron ball was the novel method employed by a wrecking concern in Chicago recently. The building in question, which is being razed to make way for the head house of the new Chicago Union Station, was an eight-story structure, covering an area of approximately 107 by 120 ft. It was erected in 1909, and being intended to carry heavy machinery, was unusually strong, the designing live-loads being 250 and 300 lb. per square foot. A test of the building made before the wrecking was begun showed it to be still in excellent condition, the floors during this test withstanding a load of approximately 910 lb. of pig iron per square foot, or four times that allowed by the building laws of Chicago.

In order to facilitate the work, as well as to economize in the amount of manual labor required to demolish the building, the wrecking concern conceived the unique idea of using an iron ball weighing over half a ton. A wrecking outfit

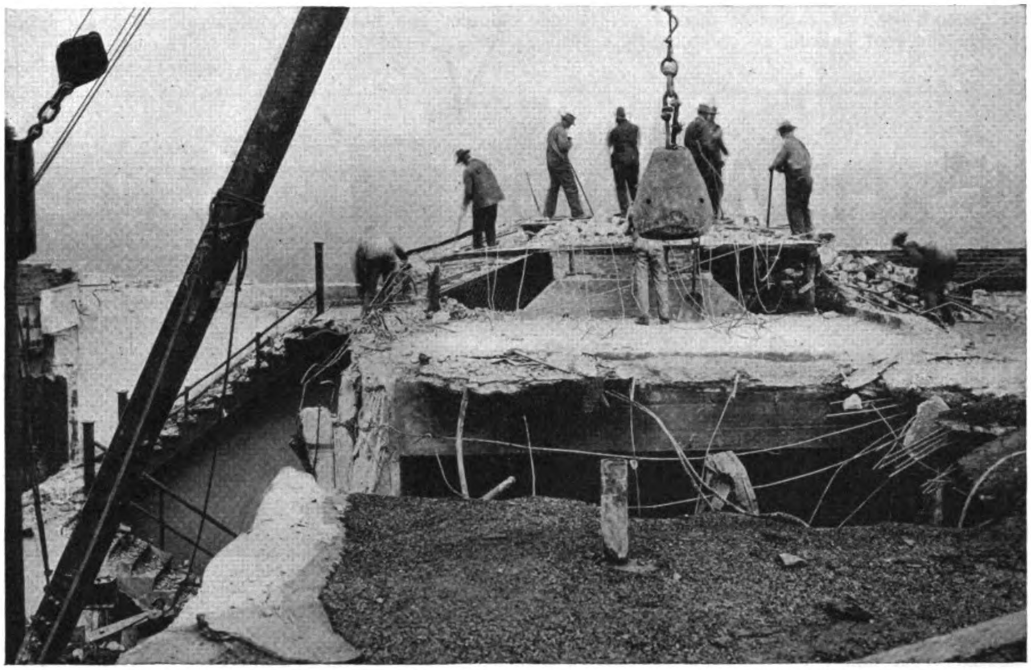


The Effectiveness of the Iron Ball Is Here Shown

that would operate between the columns of the building was constructed. It consisted of a stiff-leg derrick and 40 ft. boom, mounted on a 16 by 24 platform with rollers, the ball, or "skull crusher" as it is called, being carried on a single fall line. A 25 hp. Thomas direct current electric hoist furnished the power for hoisting and swinging. The job of hoisting the various parts to the roof of the building and assembling them was a difficult one, several days being required for the work.

The method employed in using the ball was to drop it through a distance of approximately 40 ft. on the central parts of a slab. This had the effect of shattering the concrete up to the column capitals or to the edges of the beams. The reinforcing bars were then cut by means of an oxy-acetylene torch. The ball was next directed over the center of the column, the blows in this instance resulting in breaking the concrete away from the rods at the base of the columns on the next lower floor to a height of 4 or 5 ft. As much of the column concrete as possible was broken off in this way, after which a fire was maintained around the column base for a number of hours and then water thrown on the column. This operation caused the concrete to crack and weakened the column. Then when the reinforcement had been cut with the oxy-acetylene flame, it was an easy matter to pull the standing mass over with a block and tackle attached to the electric hoist. The beams, of course, were brought down with the columns, and the ball was also used to break up pieces of concrete too large to be loaded for hauling away. The brick walls not backed by concrete were easily knocked over by swinging the ball against them.

Of a force of sixty-five men employed in wrecking the building, only four were required to operate the iron ball. Ten weeks were required to raze the building, the work proceeding at the rate of a floor a week, with two weeks for the heavier construction of the basement. The total cost of demolishing the building, without taking into consideration the question of salvage, was approximately $20,000, or about 15 per cent of the original cost of the building. This compares with 10 per cent on the wrecking of other reinforced concrete buildings, the difference being due to the present high cost of labor.



The Iron Ball Used to Wreck the Building and the Result of One Blow

How to Construct Terrazzo Floors

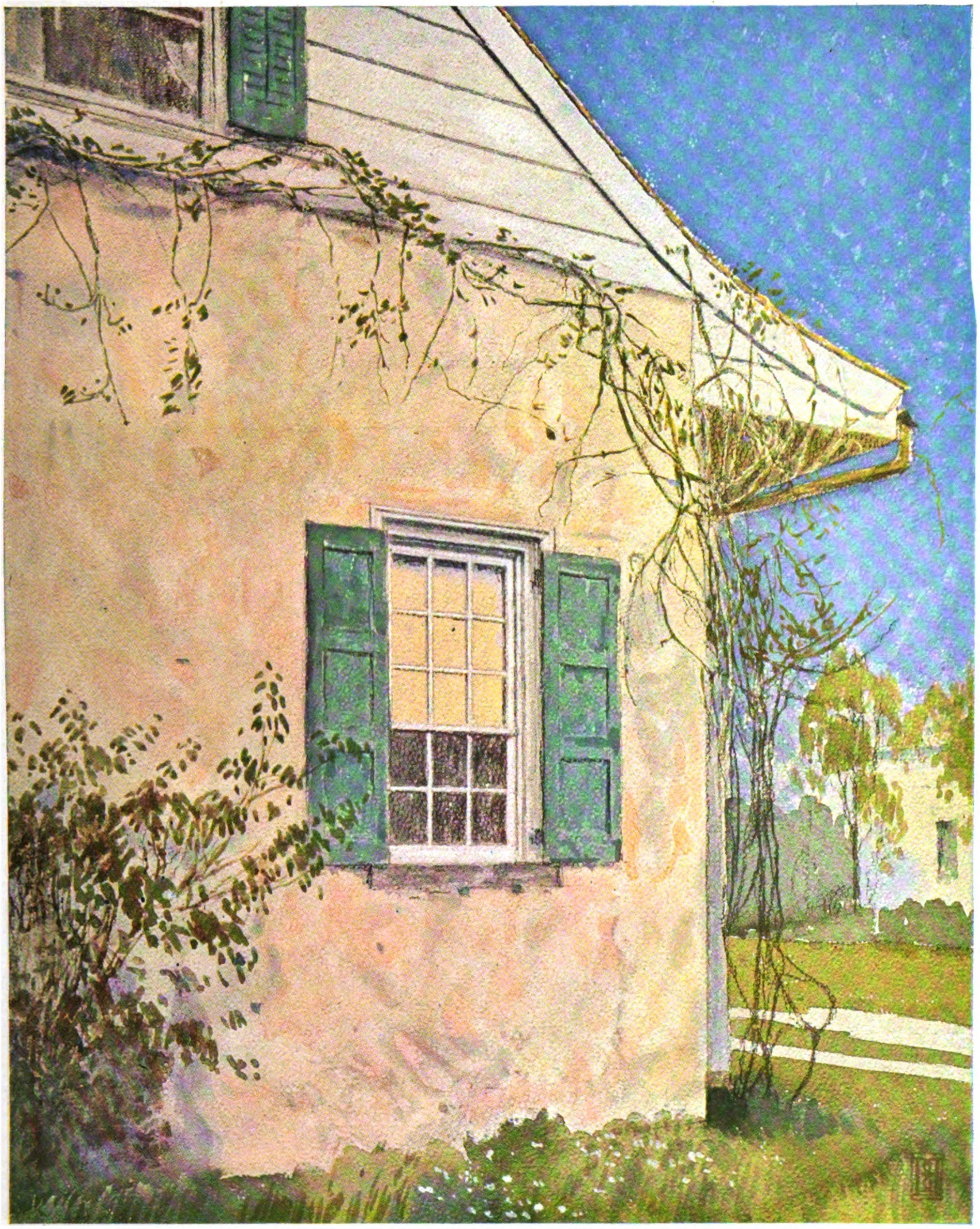
CONCRETE mosaic floors have been built to quite an extent and have been the subject of no little discussion in the building trades papers. A recent issue of the *Cement World* contributes the following to the literature of the subject:

"The floor must, of course, be constructed in various courses. The foundation slab should consist of a concrete mixture of one sack of Portland cement to 2½ cu. ft. of sand, to 4 cu. ft. of pebbles, and should not be less than 4 in. in thickness if deposited upon the ground. If it carries a load or rests on beams, it is designed accordingly.

"Upon this foundation there should be placed a ½ in. layer of cement mortar mixed to the proportion of one sack of cement to 2 cu. ft. of sand. Within 24 hours a ½ to 1 in. layer of cement and marble chips mixed to the consistency of paste should be deposited. These marble chips should vary in size from a pea up to ¾ in. in largest dimension. The proportion of this mixture should be 1:1½.

"This cement marble layer should be spread so evenly that the broad marble surfaces will turn upward and should be thoroughly tamped and rolled with a roller weighing 100 lb. per lineal foot. There is no limit to the variety of surface finishes which may be obtained by careful selection of aggregates. Aside from the proper selection of materials and laying of the concrete, the proper time for grinding the surface is most important. If the floor is allowed to get too hard it is almost impossible to secure a uniformly satisfactory finish.

"The floor should be rubbed to a true, smooth finish by the use of sandstone or carborundum. Afterwards it may be oiled or may be rubbed to a high polish by the use of a honestone. There are on the market several types of machines for this purpose."



The stucco of colonial times owes its charm of color and texture to Time. This article describes a new stucco colored with aggregates and hence charming from the very start.

Color Stucco that is Beautiful and Lasting

How the Result is Secured

A WIDE interest is developing in color effects for stucco, because judicious toning of wall surfaces adds greatly to the beauty and individuality of the stucco house.

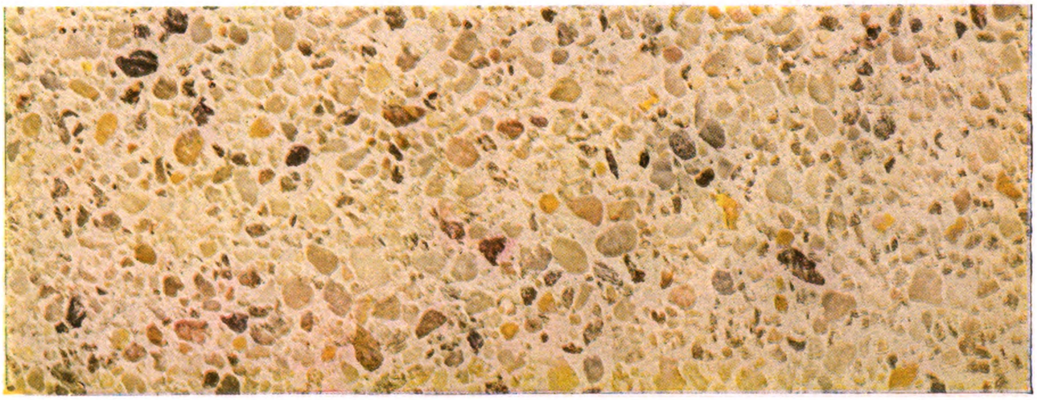
White stucco, composed of white Portland cement and white sand or marble dust, is almost dead white when new, but with time it tones or mellows gracefully. To force this toning, or to contribute a distinct color, there have been until lately only two methods in general practice: First, coating the wall with a wash; and second, mixing color pigments in the mortar.

Coating the walls has two disadvantages: the coating requires periodic renewals, and the effect is likely to be too monotonous and uniform for real beauty of tone.

Colored illustrations and material for this article furnished through the courtesy of the Atlas Portland Cement Co.

1 part white cement; 1 part white sand; 2 parts mixed red and yellow marble screenings. Integral method.

1 part white cement; 3 parts white sand; $\frac{1}{8}$ to $\frac{1}{4}$-inch Pompton pink granite screenings cast on and lightly floated.



1 part white cement; 1 part white sand and 2 parts $\frac{1}{4}$-inch gravel of naturally variegated color; integral method.

Artificial coloring matter mixed in the mortar gives tones more permanent and somewhat less monotonous. To secure good results, however, very great care must be used in the selection of artificial pigments and also in the methods of manipulation. A very small percentage of the concentrated pigment is needed, so that variations in amount of pigment or in the thoroughness of mixing in successive mortar batches is apt to make the stucco uneven and streaky in color.

With both these methods—coating and pigments—there is an artificiality of appearance that cannot be avoided.

Now, we have another method of providing color for stucco. It not only makes the color permanent, but adds a charm, individuality and texture that is so interesting that it may almost be considered a new kind of stucco.

Natural Colors from Colored Aggregates

This method uses warm-colored sand or pebbles, or richly-colored marble or granite chips as the aggregate for the stucco. In this method the faults of the previous methods are overcome. The colors are natural—not artificial—and they are as permanent as the sand and stone. The natural variation of color in the aggregate gives a variety to the

Aggregate-toned Stucco Residence, Kew Gardens, L. I. Built 1917. *Marvin & Davis, Architects. John K. Turton Co., Contractors. Stucco on Terra Cotta Block. Finish Coat in White Cement and Bedford Pink Felspar*

stucco that frees it from all monotony. By careful selection of the aggregate, life and character may be given to the surface. There are almost unlimited possibilities of variety in color, wealth of tone, and interesting texture with this aggregate-toned stucco, because there is such a variety of aggregates. And, of course, different aggregates may be combined, as, for example, the red and yellow marble screenings in the first panel shown in color on this page.

In using color aggregates, white Portland cement must be employed, since gray cement fails to bring out the true color values of the aggregates.

There are two ways of introducing the aggregate. In the integral method the aggregate is mixed in with the cement and sand. In the other method the aggregate is thrown on, and impressed with a float. It is understood, of course, that these methods of securing color refer only to the finish coat, the first and second coats remaining the same as in ordinary stucco work.

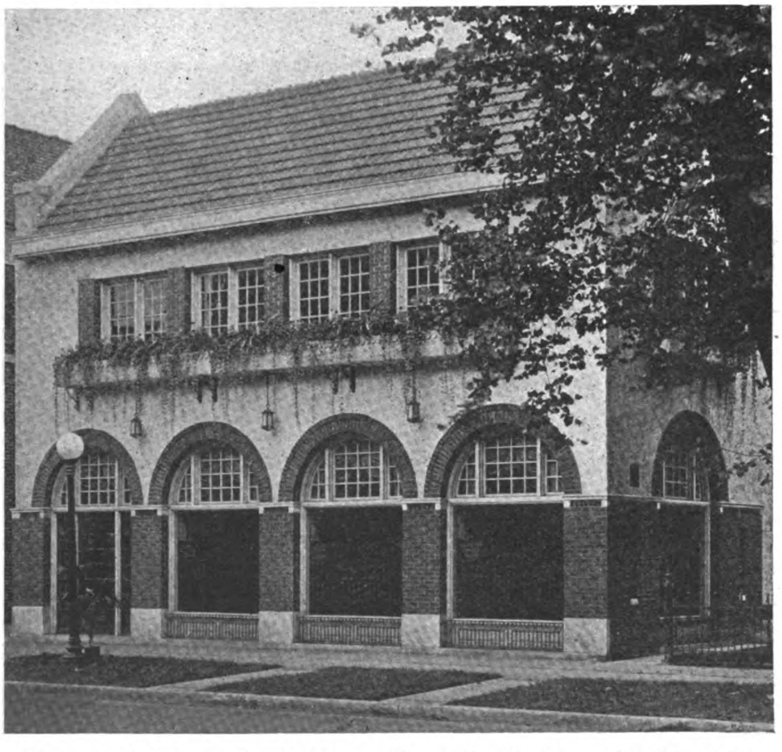
Color Stucco by Integral Method

In the integral method the brightly colored stone chips or soft warm-colored pebbles should be rather small—not more than ¼ inch in diameter. Particles that are too large make it difficult to manipulate the stucco, as well as finish it. Only with very careful attention to workmanship can larger aggregate be used.

After the stucco has been applied and has set, but before it hardens (about two hours after applying), it is scrubbed with an ordinary stiff scrubbing brush and water. The scrubbing exposes the aggregate by removing the thin film of cement which covers the particles when they are incorporated in the wet mortar. When the surface film has hardened so much that it cannot be removed by scrubbing with clean water, a solution of one part commercial muriatic acid and four parts water is used for the scrubbing. Then the stucco is sprayed with water to remove all traces of the acid, which would be likely to stain or injure the stucco if it were left. This acid washing costs only a fraction of a cent per square foot, and does not require skilled labor.

Since the aggregates constitute the greater bulk of the mortar, any normal inaccuracy in measurement will not make an unpleasant contrast—on the contrary, there will be a slight variation that is agreeable.

The "dash" method consists of throwing the pebbles or stone chips forcibly against the fresh mortar and then slightly embedding them by pressing lightly with the float. The pebbles or stone have been well washed and wet when they are dashed on, and so they do not require any subsequent washing or acid treatment. This method gives a beautiful texture, but to secure this



Motor-car Salesroom, Bartley-Wonser-Saxon Co., Indianapolis, with Aggregate-toned Stucco Walls. Burns Realty Co., Designers and Builders. Herbert Foltzm, Consulting Architect

result only experienced workmen should be entrusted with the "dashing," because care is required to produce a sufficiently uniform but variegated appearance. The size of aggregates used may be from ¼ to ⅜ in.

Aggregate Suitable for Color Stucco

Any sand, pebbles or stone chips suitable for ordinary stucco work may be employed in color stucco. When special effects and decided colors are wanted, however, special aggregates are employed. By using chips of marble, felspar or granite, practically any color may be obtained—white, pink, yellow, green or red—and beautiful combinations and varieties by the use of different colored aggregates.

In quarrying and finishing large stones there is considerable wastage of small chips or spalls. As the chips for stucco are nothing but this waste crushed to size, the cost for the stucco aggregates is not great—particularly as the quantity for an ordinary size house is small, about two or three cubic yards only.

An aggregate much used and found nearly everywhere is ordinary coarse yellow sand. Beach sand is not suitable as it is too fine. Yellow sand with white Portland cement tones the stucco from a delicate cream to a buff or light yellow, according to the sand used.

Architectural Possibilities of Color Stucco

Color stucco is a material susceptible of so many architectural treatments as to be suitable for almost every class of home. It is equally suited to the small bungalow, simply finished in a warm buff and nestling in its natural surroundings, and to the commanding residence of pure white or delicately toned stone chip finish.

As a building material, aggregate-toned stucco has in high degree the three prime requisites: Beauty, which improves with age; fiitness, for any form of architectural design, and every sort of environment; and durability, under every condition of climate and construction.

How to Lay Out and Frame Stair Work

Interesting Comments by a Mill Man on This Phase of Work—Various Details to Be Considered

STAIR-BUILDING is one of the branches of the carpenter's and joiner's trade that is being generally left for the mill man to lay out, and in most cases the carpenter-contractor wants the work all cut and framed, ready to set up. He can get the other materials for the ordinary dwelling house at most lumber yards that carry any variety of stock, such as frames, doors, sash and moldings, but when he comes to the stairs, that is another matter, and he calls for the mill man.

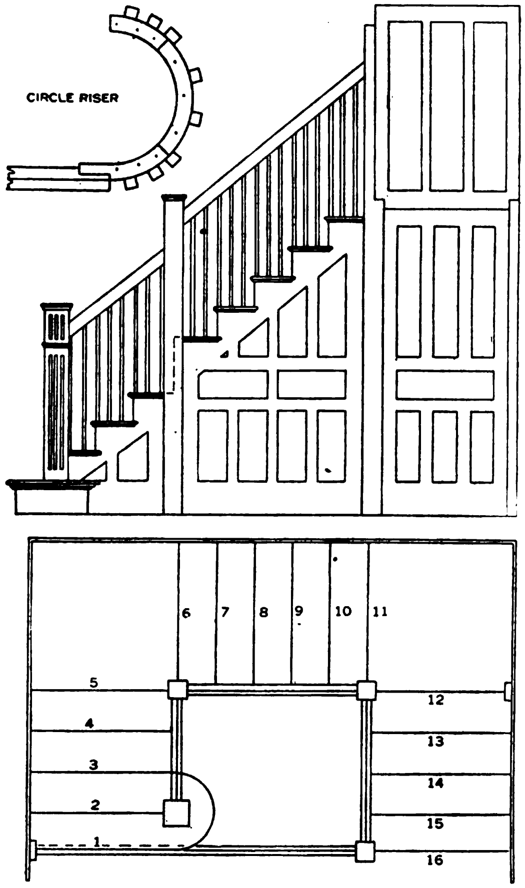
At one factory where I was foreman, in many cases the only mill work we did for some cheap houses was the stairs, framed complete, ready to set up, says W. J. Malette in the *Wood Worker*. I went to the job and measured up the openings that the carpenter had laid out, and usually could figure out a set of stairs to fill the space. The most frequent difficulty was lack of head room, which made the stairs very steep unless the headers could be cut back without great expense or trouble.

I usually try to get at least 9-in. run and less than 8-in. rise, if possible, and where there is room I use 10½- in. run and 7¼-in. rise. It is very important that the rise and run be uniform throughout the entire flight, and this is sometimes very difficult, with one or more landings to be considered, if the openings are not properly laid out. Winding treads are to be avoided wherever possible, for they are more expensive and harder to lay out in the shop, and are always dangerous and more difficult to use after being completed.

The question of railing and spindles is usually arranged to suit the purse of the owner, and most all stairways are made with posts at the angles, instead of the easings and crooks, that require an expert stair-builder to lay out and erect. The open treads, with the spindles dovetailed into them, make more work laying out and framing in the mill, than the closed or box string, with the spindles set on top of the string cap, but I think they are enough better to pay for the added expense. Wood panels in triangles and under the soffits add very much to the appearance of the completed stairway, but cost more than lath and plaster for the same space.

Of course, in high-grade buildings the stairways are designed and drawn by competent architects, and can be elaborated to an almost unlimited degree. There is a lot of satisfaction in laying out and building such work, but this article is not dealing with that class of stairs. The set shown in the sketch is the kind commonly required in a moderate-priced dwelling, and can easily be laid out and framed in the mill by the stair-builder that most mills keep in their force of workmen. Many such men can lay out, bill in and frame the stairs with only a crude sketch showing the plan, giving the

number of treads and risers and the necessary measurements.



How to Lay Out Stair Work

When the mill work is all laid out and billed in from the drafting room, a scale drawing is required to show the material necessary and how to frame it together. The pitch panels must be laid out full size on paper or platform before the joints can be cut, but the lumber can be billed in from the scale drawing. After the foreman has laid out the strings for housing or mitering, as the case may be, they can be laid on the platform to get the exact line of the pitch joint of muntins, rails and panels. The pitch board used to mark the strings will, of course, give the exact bevel cut in each case. In the case of open strings the string forms the top rail of the panel work.

The design of the panel work should be made to match the doors in the adjacent rooms as near as possible, but the bottom rail should be the exact height of the top of the circle tread. Raising the face of the panels adds to the appearance more than moldings and is much cheaper and cleaner. The posts should be housed out for all treads, risers, strings and panels. This can easily be done in the shop, and enables the carpenter to set up the stairs with no possibility of error, and makes a strong, durable job throughout.

Making the Circle Riser

There are several ways of making the circle riser. The quickest and best method is to lay up the circle part with short scrap pieces to the height of the riser. Make the shell about 2 in. thick and ¼ in. larger than the radius of face of riser, using nails and glue, with the nails near the inside of the shell. Then band-saw the face of the shell the thickness of the veneer inside of the finished face radius, and leave about 4 in. of straight on one end, with ½ in. cut out to halve on a piece of ⅞-in. straight cull lumber for backing for the straight part, using countersunk screws from the face side. Veneer ⅛ in. thick and 1 in. wider than the height of riser (to allow for trimming afterward) can then be glued on, clamping a straight board over the straight part, then spreading the glue on the curved part and using narrow cleats to draw the veneer tight. Begin next to the straight part and set them as close to each other as the clamps will go around the circle, using a clamp on each end of each cleat to insure evenness. A temporary stay or brace should be nailed on both edges of the riser from the end of circle part to the other end of straight part, to prevent the handscrews drawing it out of shape.

The Newel and Angle Posts

The starting newel can be paneled or fluted, but the angle posts should be plain, with simple caps. The treads should be dovetailed out for the spindles and the end nosings mitered on one end and returned on the other end. The nails can be sent long enough to cut between the posts at the job, but the spindles should have the lower end dovetailed to fit the treads. The landings are made of ⅞-in. flooring to match the wood of the treads and nosings, and, of course, is put on at the job. The wall strings are molded to match the room base, and if the triangles and soffits are plastered, the lower edge of the outside strings should be molded the same way. If there is no cellar stairway under this set of stairs, the section of framed panel under the upper landing can be hinged, thus forming a door to the convenient closet formed by the enclosing panels.

The Kid Puts one Over on Old George

Echoes of the Noon Hour---VI

The Gang Delves into the Realm of Practical Jokes

By Edward H. Crussell

THERE had been a great deal of excitement in the neighborhood over the fact that the grocer on the corner had discovered a tarantula in a bunch of bananas. The Kid, who was (as we have already indicated) of an inventive turn of mind, had taken advantage of the talk occasioned by it, and had made a most fearsome looking insect out of a burnt cork, two white beads, and some ends of string. This contrivance, attached to a thread, he had let down in front of Old George's spectacles while the latter was busy filing his saw, and the hubbub that ensued started a fresh source of excitement.

George broke a pane of glass and cut his wrist on the saw. So that it was some days before it was thought safe to say either tarantulas or bananas in his presence. In the noon hour of the third day the Kid made a public apology. After he had been forgiven and had listened to a brief but comprehensive lecture on the subject of "Respect to your elders," the talk naturally drifted around to reminiscences of pranks and practical jokes.

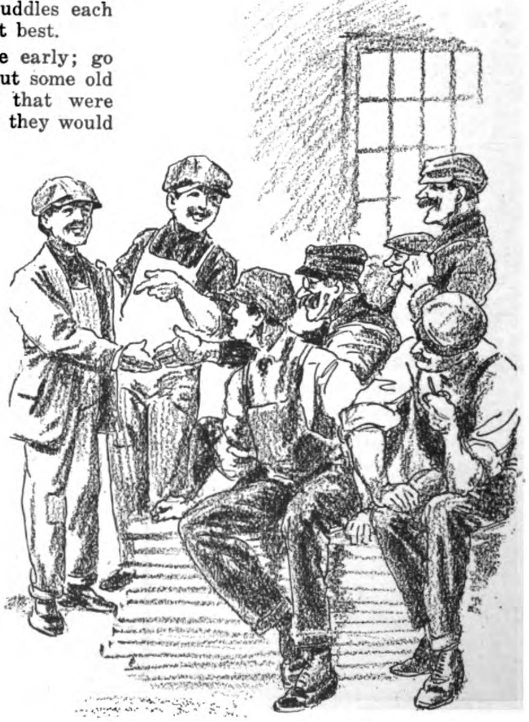
Bliss led off with an account of his experiences in the locomotive works. Amongst other things he told of the doings of the imps of darkness in the forms of boys that used to heat rivets in the boiler shop. "One of their favorite amusements," said he, "was to get a small cast iron ball from the foundry, heat it almost red hot, and lay it on the turntable, just before noon. The fellows from the mill used to cross the turntable on their way to the check office, and almost every day some fresh victim would think he had found a nice little rubber ball for his youngster to play with, and burn his fingers off learning his mistake. One ball used to last quite a while for this amusement, none of the finders ever succeeding in carrying it away.

"The oldest of these kids was not more than fourteen and I used to wonder how they could think up all their devilment; no one could keep ahead of them. They used to carry their tongs hung around their neck when not in use, and some of the men got into the habit of taking hold of the ends of the tongs whenever they got the chance, and squeezing the kids' necks in them. This kept the kids at a distance for a while, but one day they were all within reach again and two or three fellows burnt their fingers finding out that the tongs had received the same treatment as the balls, that is, the ends of them had been made almost red hot in the forge."

"You can always depend upon a kid to invent some new form of practical joke," broke in Scotty, "but I think the most original idea that I have come across in this line was evolved amongst the kids of the firm where I was apprenticed. From our viewpoint, it had one solitary drawback, it could only be used on a rainy day. There were several thousand men working for this firm and on a rainy day, once they got inside the gates, you would see them running for cover in all directions. There were not sidewalks and with the yard full of puddles each one took the road he thought best.

"The kids would get there early; go to the scrap pile, and pick out some old pieces of thin boiler plate that were punched full of holes. These they would lay, convex side up, in the puddles, forming inviting stepping stones. Inviting but deceiving, because whenever a fellow made a little jump to land on one of these plates, his weight should force it down, causing the water to spout up through the holes and drench him. He'd be lucky if he didn't land so that one hole came just behind his heel, in which case the water would shoot right up the leg of his pants and hit him in the back of the neck. I don't suppose we ever caught the same person more than once, but every rainy day there were new victims and the trap was working as well when I left as it was when I started in, five years before.

"There was one thing in connection with this firm that I have often thought of since. It was the only firm I've ever worked for that made a studied effort to prevent pilfering by the workmen, and the only place I've worked where a large number of men seemed to make a business of stealing material. I have always felt quite certain that if no precautions had been taken the loss to the company would have been less. The men were not searched, but they all had to pass single file through a passage with a watchman at each end of it. Nothing could be taken out without a permit, not even one of the workman's own tools. Yet with all the precautions enough stuff to fill a box car was carried right past the watchmen every day. It seemed to me that the fellows just took out material to prove that they could do so, and the ingenuity of some of their methods was worthy of a better cause. I heard of one man who took out a full length bil-



"Meet My Kid Brother," Said the Kid

liard cue, and I knew of another man who took out a piece of steel ¼ in. x 1½ in. x 8 ft., which he had drilled and countersunk for screws and intended to use as a track for a sliding door.

"The fellow with the billiard cue waited for a rainy day, then he pushed one end of the cue up his coat sleeve and the other end of it down into his folded umbrella. The one with the door track merely rolled it up in a coil and buttoned it under his coat."

"The Kid, who since his apology had seemed rather quiet and preoccupied, now broke in with: "I wonder you fellows are not ashamed of yourselves; grown men, with one foot in the grave, glorying in the practice of malicious jokes and in the companionship of thieves and robbers. Nice examples you are."

"Don't you worry, Kid," grinned Shorty; "you know the old proverb about the bad egg, nothing you hear is likely to spoil your morals."

"I'm not worrying about the effect that your shortcomings will have on my morals," was the reply, "and for a very good reason, this is my last day with you. I'm quitting to-night."

It was some time before he could make them believe that he was in earnest, and then—all speaking at once—they wanted to know what was the matter with him.

"It's this way," he explained; "you know how we are fixed at home, mother, my kid brother and myself. We've been trying to put the kid through high school and were getting along all right until Uncle Sam declared war. Since then it's been one continual squabble with him, morning, noon and night. It finally got to the place where I had to do something to prevent him enlisting, so last night I enlisted in the aviation corps and I leave for the training camp to-morrow morning."

"After I Enlisted All Dad Could Do Was Smile"

There was an awkward pause for a minute or two, and then Old George said soberly, "Well, of course you know your own business best, Kid. If you have already enlisted, there's no use for further talk, but I suppose you have it all figured out; how your mother is going to manage while you're away and so forth?"

"Yes, George," smiled the Kid. "We've all of us done a good deal of figuring, and we've decided that this is the best way—in fact, the only way out. It hasn't been easy to decide, but I've felt better since making the decision than I've felt for months.

"When dad was killed in the Philippines he was only a year or two older than I am now. I was too young to remember him, but mother had a crayon enlargement made of one of his photos, and, as occasionally happens, the crayon enlargement looks more like the original than the photo did; at least that's what mother says. Those who see the photo and don't know different, think it's a picture of me in uniform and ask embarrassing questions. Anyway, that crayon picture is about the only father I've ever known; it hangs in the front hall and I remember as a kid that when I had been playing hookey or getting into some other mischief, I used to enter by the back door so that dad might not see me. It used to seem to me that I could fool everybody but him. When I'd done well he'd smile; when I'd done wrong, he'd still smile, but a very grim sort of smile, one that always stared me out of countenance."

The Kid's voice had got a little shaky with the last few words, but after a pause he continued more steadily. "For some time past I've been catching myself avoiding the front door, and whenever I have used it, I've had to keep my eyes turned from the picture; but last night, after I had signed on, I marched in that front door, and I looked dad square in the eye, and all he could do was smile, and it was the right kind of smile.

The Kids Would Take Some Boiler Plate Punched Full of Holes and Put it Over a Mud Puddle

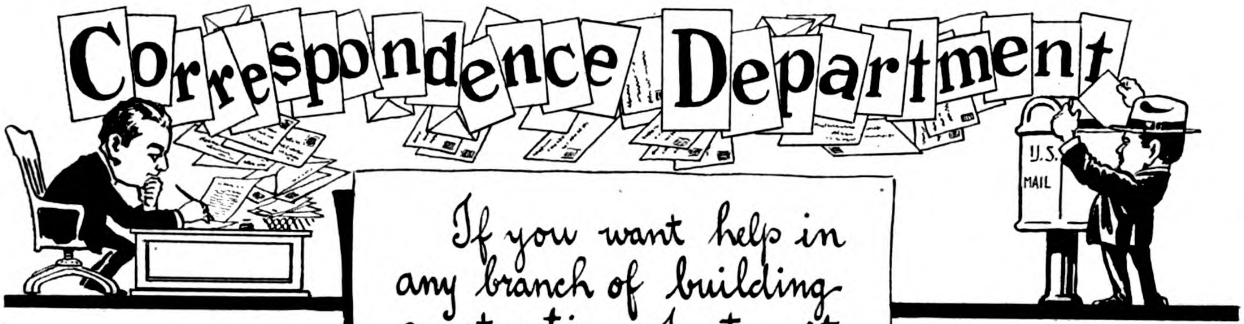
"No, George, don't you worry about me; I know what I'm doing; I'm going to get an education and you are going to help pay for it. Of course there is a chance that I may not come back, just the same as there is a chance that I might stay here and some day fall off a scaffold and break my neck. I'm merely taking my choice."

Again there was general talk, with everybody joining in, and then Scotty declared: "You've got the right idea, Kid. I wish I was young enough to go with you. What I'm worrying about now is, what the mischief are we going to do without you? I wonder what kind of an un-licked specimen of a cub the Old Man will hire in your place?"

"As it happens," answered the Kid, "I'm in a position to enlighten you. And speaking of angels," he added, as a well-built young fellow about eighteen years old appeared around the corner of the building, "here he comes now."

"Fellow workmen, let me make you acquainted with my kid brother. Bill, shake hands with the gang, every one of them is a good friend of mine, and I know they are going to be good friends of yours. There is only one thing I must caution you about; never say spiders to that benevolent looking old gentleman with the spectacles; they are one of his pet aversions."

(*To be continued.*)



Correspondence Department

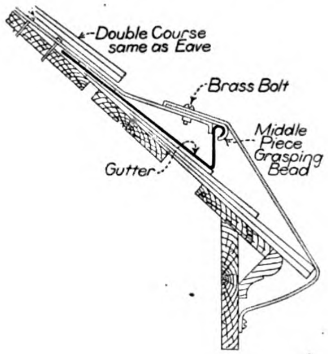
If you want help in any branch of building construction. Just write to the Building Age Correspondence Dept.

We will be glad to answer all your questions without charge.

All readers are invited to discuss the questions and answers published.

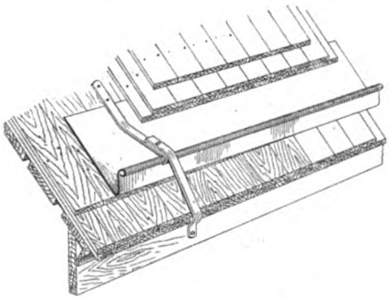
SHINGLE COURSE GUTTERS

From W. B. Gray, Louisville, Ky.—A method of attaching sheet metal formed gutters to shingle roofs as used in Kentucky is shown in the accompanying illustrations. A double course of shingles above the gutter is best, no matter what the method may be. I have never attempted to place such a gutter on a finished roof not shingled with a view to using it, without doubling the course above. A single course beneath the gutter showing more to the weather, really no showing at all, enough more to get the fall without riding the jog of a course, works all right. When a new roof is being put on and it is intended to use the coursed gutter it is our practice to place a wooden strip ⅛ x 1 in. along under the butts of the gutter double course of shingles. When the sheet metal or roofing man comes along he pulls out those strips and has no trouble in pushing the gutter under as desired. We also put in place the roof-piece of the hangers as the shingles are put on, dropping from the regular course level to allow for the fall in the gutter. We use a three-piece hanger as shown, and fasten it to the roof above the upper edge of the gutter bed, so that there are neither nails nor screws through under the weather face of the double course of shingles nor through the hanger bars up to which the gutter bed will project.



Method of Attaching Gutter

The gutter may thus be put up at any time after the roof is finished and can be renewed at will without disturbing the shingles. The shingles hold it down and in place at the upper edge. The bar fastened to the roof is a guide to set up to at the end; it stiffens the gutter like a brace, and the bolt going through the middle hook piece prevents the gutter from slipping down and out from under the shingles. The top piece strengthens the whole arrangement, keeps wind from lifting the gutter and is a sort of snow guard. It attaches to the cornice board at the bottom, passes over the hook piece at the top and has the end hooked down to keep ice and snow out from between the bars as much as possible. The bolt is brass. The bars are shown as solid, but we use galvanized plumbers' punched "tape" of light weight.



Removable Sheet Metal Gutter for Shingle Roof

THE SIZE OF SEPTIC TANK NEEDED

From B. A., New Jersey—I have noticed the inquiry of "M. F. L." in the issue of Nov. 30, and the following may help him. The number of fixtures installed is given, but there is no clue as to the number of people who will use them. Generally 75 gal. per person per day is the basis upon which to figure the size of a septic tank. For efficient results the tank should be two and a half times as long as it is wide, from 5 to 8 ft. deep and with a retention period of 24 hr. The system should consist of a settling tank, an effluent tank with automatic siphon, an equalizing chamber and a disposal area.

The tanks should be made of brick or concrete with 8- or 6-in. walls. If of brick, they should be laid in cement mortar and walls should be plastered with one-half cement mortar made of one part cement and two parts sand. The bottom should be two courses of brick laid in mortar and plastered or 4-in. concrete.

If walls are of concrete, mixture should be one part cement, two parts clean, coarse sand and four parts crushed stone. The settling floor should slope toward the inlet pipe, which should extend down about one-third distance below flow line, so incoming sewage will not disturb proper operation. Inlet pipe from house should be preferably of cast iron laid to grade of not less than ⅛ in. to the foot.

The front wall of settling tank which separates it from effluent tank should be made lower than other walls so that effluent will flow over it into next tank. To secure an even flow the entire width of tank and to prevent scum or mat from flowing into second tank, a slotted baffle board of wood or metal should be placed about 4 in. from overflow wall and should extend 6 in. above and 18 in. below surface.

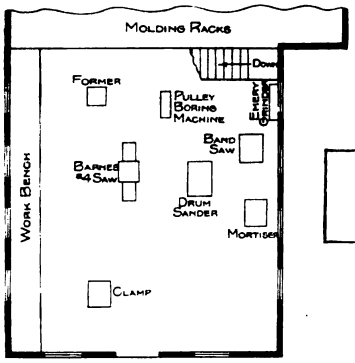
The effluent tank should have an automatic siphon discharging two or three times a day and the floor should slope toward the siphon. The siphon discharges into an equalizing chamber which is a small concrete tank with flash board through center from which drain tile laid

from 12 to 15 in. underground with open joint have 75 ft. of 4 in. tile for every 100 gal. of discharge. The flash boards in equalizing tank permit only half of disposal area to be used at one time so that other half can rest. This prevents the soil from becoming sour and giving off offensive odors.

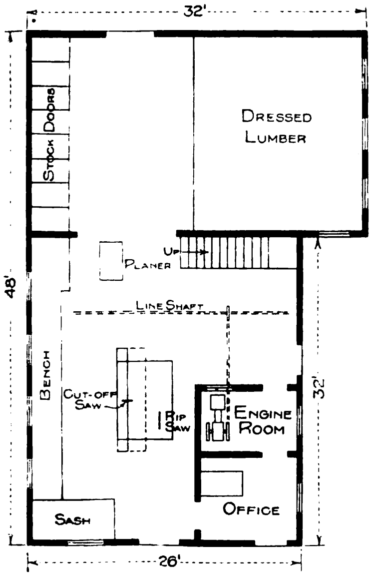
This kind of installation is for use where soil is sandy or sandy loam.

CONTRACTORS' WOODWORKING SHOP

From Spencer & Norton, Arcade, N. Y. We are sending herewith sketches of our woodworking shop. The shop was erected about five years ago, since which time our business has been increasing. Here in the shop we do everything made of wood that is used in building and also give attention to the making of special furniture. Late in the winter we started cutting the frame for a two-family flat which we built on Lisbon Street, Buffalo, after which we cut all the studding, joists, rafters, etc., made up the window frames and odd sash and shipped the stuff in a car. We do not feel that it pays to make stock sizes of sash, doors, etc., but we make all odd work and get out the most of our trim and mouldings in the shop.



Plan of Second Story

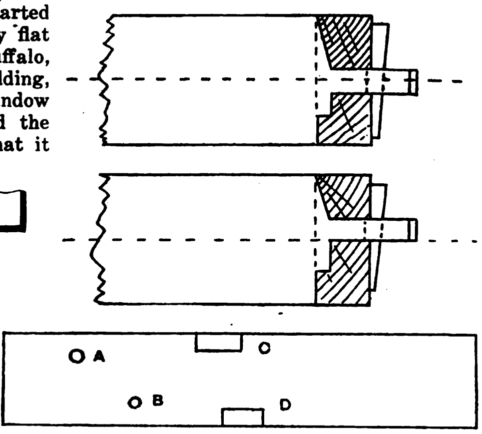


Plan of First Story

FRAMING A TUSK, TENON AND MORTISE

From A. C., London, England.—There is some contention among my fellow-workers regarding the tusk, tenon and mortise joint as used in floor timbers.

The centre of the tenon should coincide and pierce the neutral axis of the timber through which it is mortised; that is, the line where the strain changes from tension to compression. Some text-books give the neutral axis as the centre of the joist, and others consider it to be five-twelfths of the depth from the top surface of the joist, consequently the proportions of the members of this joint vary according to the contention of the joiner. The two forms of joints are shown in Figs. 1 and 2.



Framing a Tusk, Tenon and Mortise

When cutting into timbers that have a transverse strain upon them, such as floor joists, etc., it is the safer plan to cut into the upper portion of the beam which is in compression, because timbers are stronger in compression than in tension; and when the hole cut is filled up again as with a tenon, it will be found not to have weakened the beam. The art of joinery is based upon the principle of removing waste from the timber so as to weaken it as little as possible.

Supposing a hole is bored through a beam in the proportion of size shown at A in Fig. 3, it would not be such a fault as shown at B. If a piece was removed as at C, and providing a piece is tightly fitted in again, the fault could almost be ignored; but if a piece was removed at D, the fault would be serious, whether a piece was fitted in or not, because the under side, being in tension, would open and cause a fracture. I consider Fig. 2 the correct method of making this joint, as the mortise is cut in the upper portion of the timber. I should like to know other readers' opinions.

PLASTERING ON CONCRETE

From B. E., Modesto, Cal.—In view of the extent to which concrete houses are being erected throughout the country, it may be interesting to some of the readers to know of the method for plastering on concrete which I have used with great success.

After the forms are taken off and all loose scales cleaned away, the wall is to be well wet down, then dashed with a mixture of 1 of cement to 2 of sand, and care should be taken that this coat is not disturbed until thoroughly set. The sand should be clean and sharp and as coarse as possible; the thicker the plastering has to be the coarser must be the sand. The mixture is to be dashed on with a broom or paddle the same as is used on outside slapdash or rough coat jobs. If this coat can stand for 24 hours or more so much the better, but it must be set before next coat is applied.

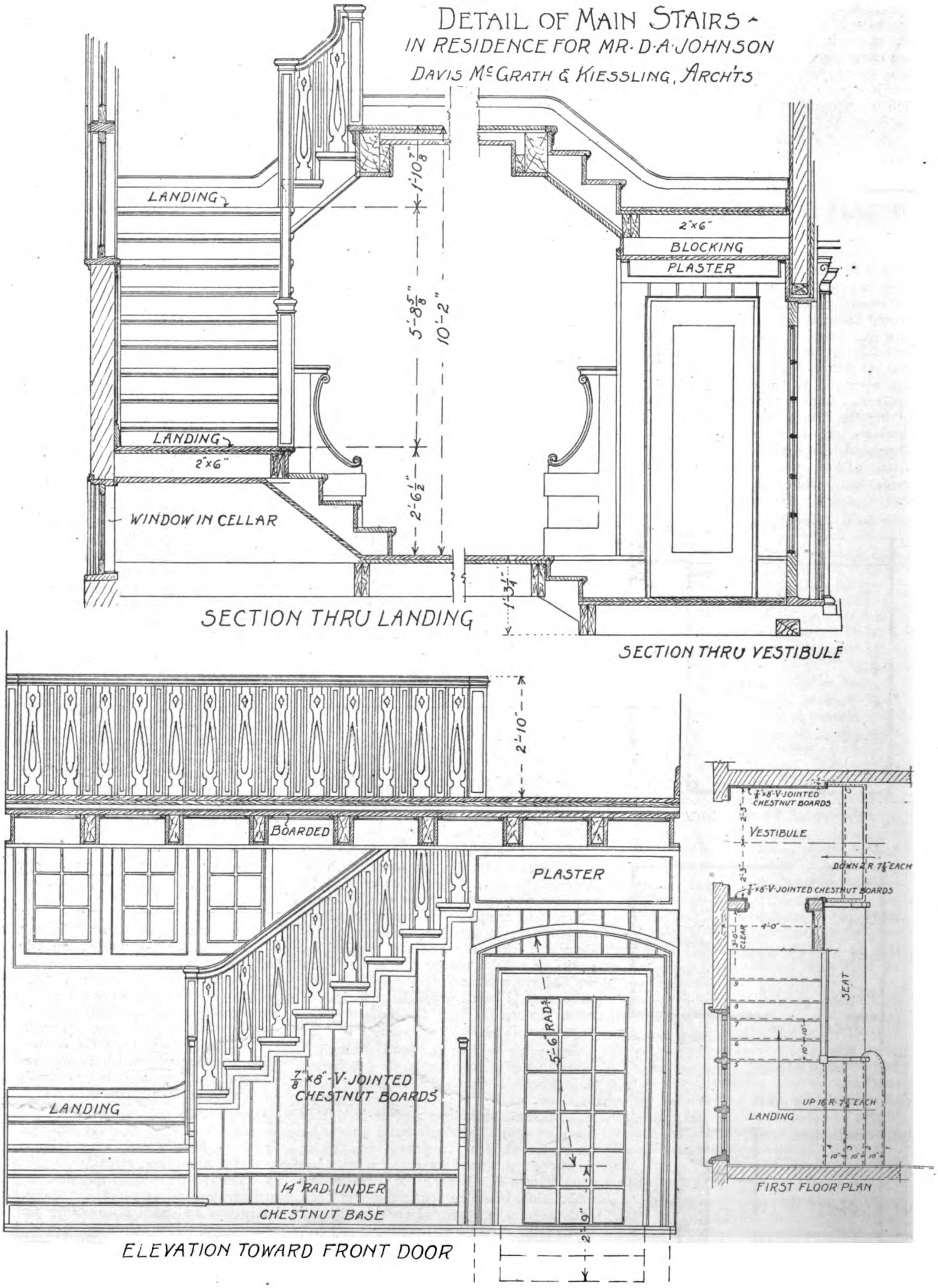
The second, or floating coat, is to be composed of coarse sand tested for voids and just the right amount of cement added to fill the voids, plus 10 per cent hydrated lime to make it work better, care being taken to avoid an excess of cement and to use as coarse a sand as possible. This coat is to be laid on with the trowel and struck off with the straight edge and allowed to set. If a float finish is desired a rich mixture may be used for a thin skim coat, care being taken to lay it on thin, the richer the mix the thinner it must be laid.

The dash coat, if used, is placed in the ordinary way, but whatever finish is used care must be taken that the under coat is thoroughly set. There is nothing difficult about plastering with cement mortar if the principles of concrete are adhered to. Tests for voids, shrinkage of materials, clean materials, non-disturbing after placing and proper curing will invariably bring satisfaction in any kind of concrete or cement work.

PRACTICAL VALUE OF "BUILDING AGE"

From "One Who Knows," New York.—I find the reading matter and illustrations in BUILDING AGE of great interest and value to me. I wonder if the other readers are getting as much out of the advertising pages as they might if they would use a few postage stamps? Did it ever occur to you, gentle reader, that an advertisement which is not read or is read and forgotten is practically lost so far as you are concerned?

The way to get something out is first to read, then use postage stamps, and answer. Nearly every one tells you to send for a catalog, circular or for other information. The manufacturer is waiting for you to ask. If you do get the literature and read it carefully you will receive valuable information and learn more about the goods which you may need for yourself or for others than you can in any other way.



DETAIL OF MAIN STAIRS—
IN RESIDENCE FOR MR. D. A. JOHNSON
DAVIS McGRATH & KIESSLING, ARCH'TS

SECTION THRU LANDING

SECTION THRU VESTIBULE

ELEVATION TOWARD FRONT DOOR

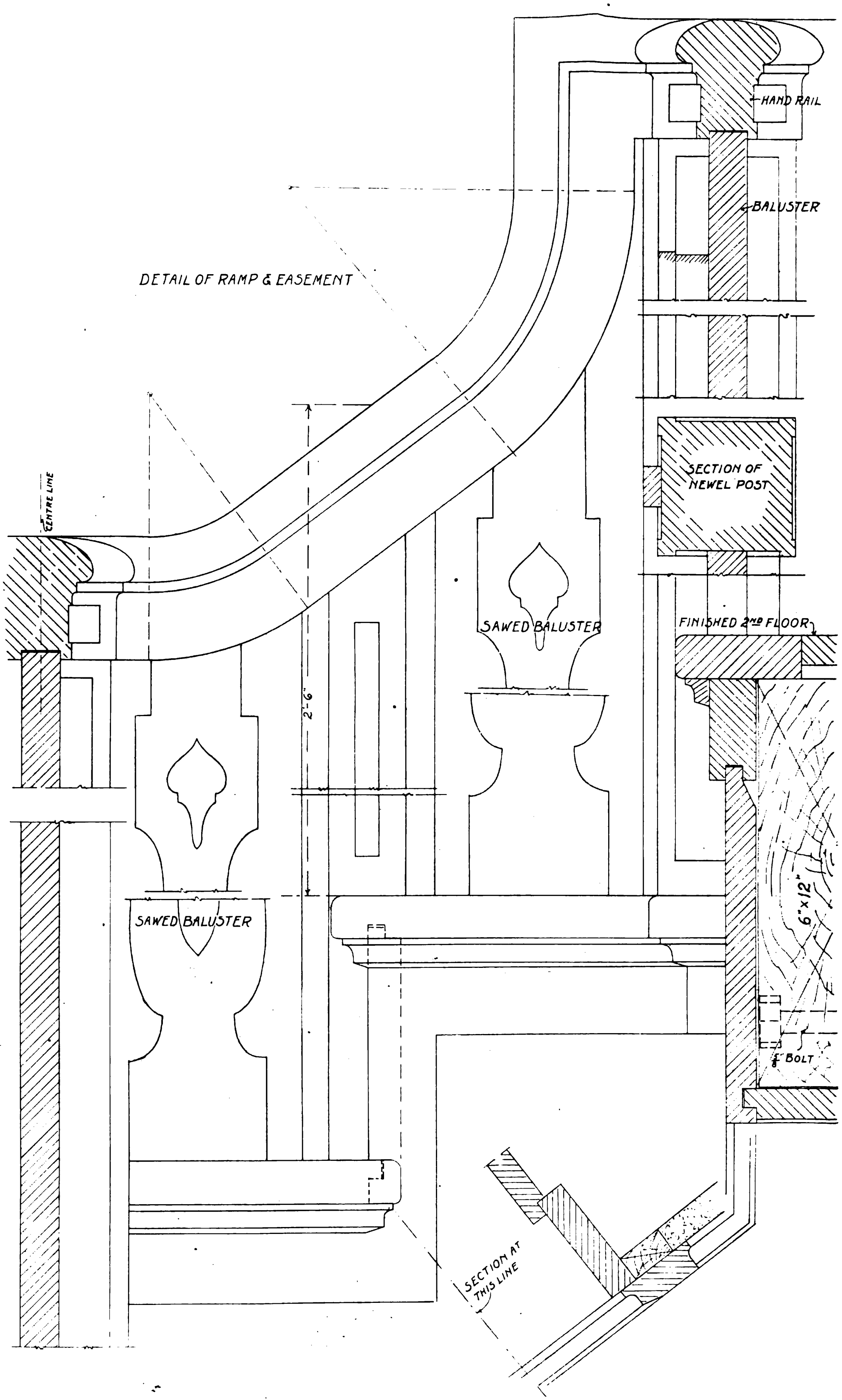
FIRST FLOOR PLAN

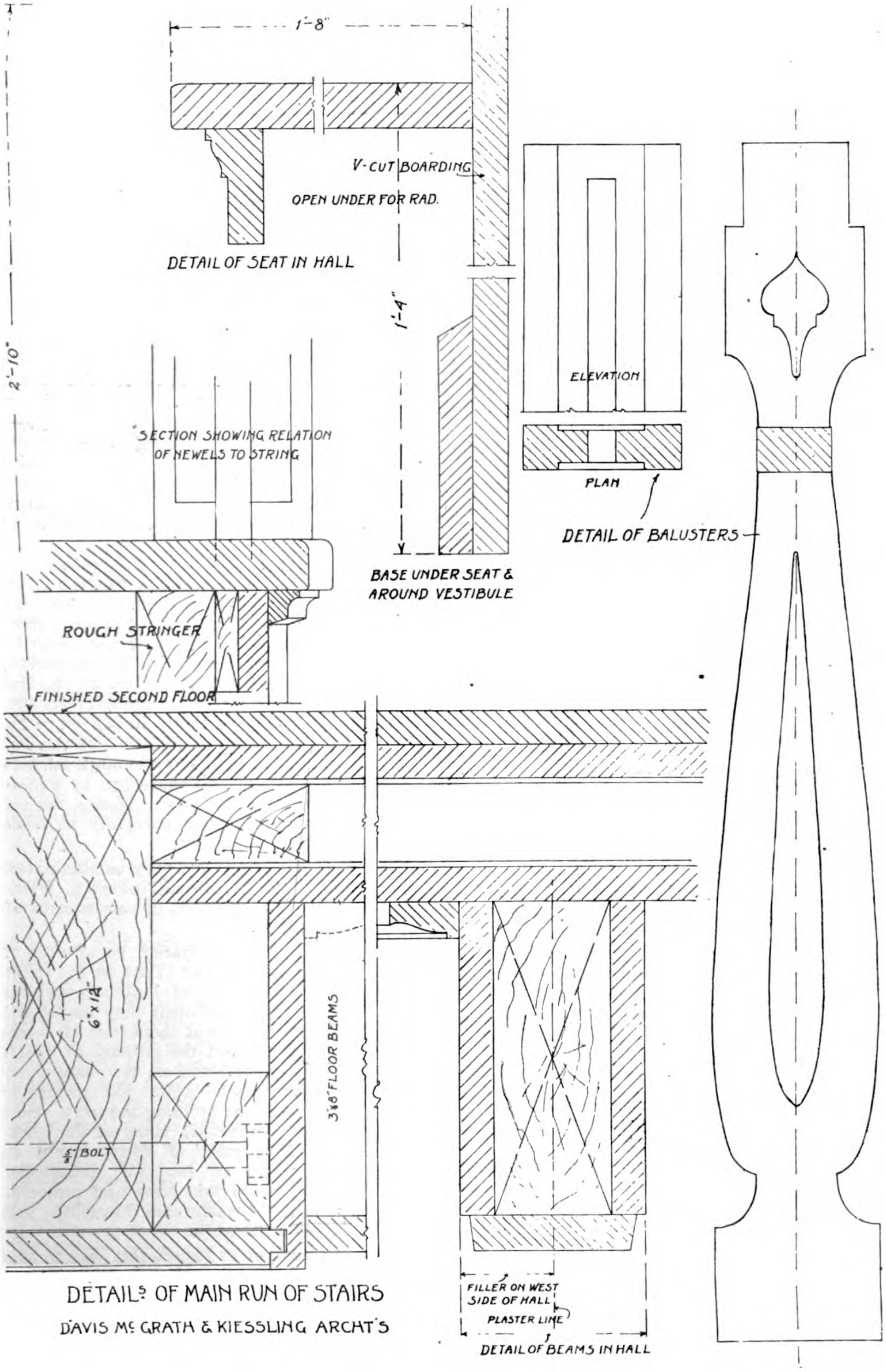
How a Beautiful Stairway Was Constructed

Chestnut is used for the stairway. The wood was given a coat of ammonia so as to obtain a burnt finish and then it received two brush coats of kerosene and turpentine rubbed in.

The drawings on the facing and two following pages show how the stairway was built.

This stairway is located in the residence of Mr. D. A. Johnson, at Englewood, New Jersey. It was constructed in accordance with plans and specifications prepared by Davis, McGrath & Kiessling, architects, New York City.


HAND RAIL
BALUSTER
DETAIL OF RAMP & EASEMENT
SECTION OF NEWEL POST
CENTRE LINE
SAWED BALUSTER
FINISHED 2ND FLOOR
2'-6"
6"x12"
SAWED BALUSTER
5/8" BOLT
SECTION AT THIS LINE



DETAILS OF MAIN RUN OF STAIRS
DAVIS McGRATH & KIESSLING ARCHT'S

WHAT THE EDITOR THINKS

ADOPT LABOR SAVING EQUIPMENT

The thousands of building mechanics who are either being drafted into the army or engaging in war work of some kind is certain to cause a labor shortage. There is only one way for the building contractor to meet this shortage—to adopt such labor saving devices as will meet his needs. If he has a large amount of tamping to do, an automatic tamper will cut time. If he is still mixing mortar or concrete by hand, let him get one of the many small or large mixers now on the market and which will do the work of many men. The man who has much to do with floors will find an electric floor surfacer an efficient aid to his work, provided, of course, that electric current is to be had in his town. In carting, a motor truck will take the place of several men and horses. A builder's hoist will save time and men. The many varieties of woodworking machinery on the market offer a large field from which to select labor saving devices in that line. There are scores of labor saving devices that you can adopt. All lines of industry are being forced to make an effort to meet the increasing cost of labor and material by the adoption or invention of labor saving equipment—and their efforts are turning loss into profit. Certain it is that the necessity of the present times is forcing the Nation into a state of efficiency which is sure to leave the various industries of the country at the close of the war in a state of decidedly higher development. It's up to contractors to search their field for labor saving equipment and to adopt it, if they are to successfully combat the high cost of building. Adopt the slogan "Reduce Costs."

RESIGNATION OF HENRY COLWELL

It is with a feeling of regret that the many friends of Henry Colwell will learn of his resignation as editor of BUILDING AGE. Since 1880 he has been connected with this magazine, taking up the editorial reins in 1893. During this long period the many who have come into contact with him have learned to respect and like a sympathetic and kindly personality that makes his co-workers and friends in the trade sincerely regret the severence of business relations.

During Mr. Colwell's connection with BUILDING AGE the magazine has grown to national importance. The trade has learned to respect the information given through its columns and to feel that the appearance of ideas in BUILDING AGE is a guarantee of their authoritative correctness.

HOW I LOWER COSTS

Have you ever used any machine or device which has saved you time and money?

Have you ever invented any way of doing a piece of work quicker?

If you have, BUILDING AGE wants your experience and will pay for it.

We will pay $15 for the best method submitted of lowering costs, either by using machinery or by short cuts in construction. And regular space rates for any other letters good enough to use.

Your description should tell just how you save time and money. Point out what methods you were using before adopting your "time saver" and show how your new method turns the trick. You can submit several articles if you want to. Your letter should be in our hands on or before April 1, 1918.

Address The Editor, "How I Lower Costs," BUILDING AGE, 243 West 39th St., New York.

PLACE ORDERS EARLY

There should be no attempt to minimize the seriousness of the freight situation. Government control of the railroads is proving efficacious in speeding freight shipments for war purposes, but it is still too early to forecast just how the nation's normal freight will be taken care of. Certainly it is going to suffer considerably, although the hope is freely expressed that regular shipments will come along better.

Contractors and dealers who want machinery such as concrete mixers, hoists, saw-rigs or building materials of various kinds should surely take the almost certainty of freight delays into consideration. The man who holds up his orders until the last minute is going to find himself in pretty much of a bad fix if he needs his order quickly. Requirements must be forecast and steps taken as far ahead as possible.

Machinery that is on hand should be taken even better care of than is often necessary or advisable in normal times. The difficulty and delay now necessary in getting spare parts or repairs should be taken into consideration. Certainly there is plenty of opportunity for economy here, for tools and equipment belonging to the contractor generally do not receive the best of care by the mechanics.

Take stock of your needs now and bless your foresight when the building season opens. You can't afford to hold back now and find yourself short of needed material or equipment then.

SHOULD BUILDING BE PROHIBITED

Published statements that the government is contemplating to refuse to issue permits for building and other capital expeditures not essential to the winning of the war is causing considerable unrest in building circles. The object is to eliminate the financing of unessential industries. At first glance it seemed as if the practical elimination of the building industry would further this nation's war aims. But this is emphatically not so.

There are two factors necessary for the successful prosecution of this or any other war—money and labor. This war has largely caused the present shortage of labor by the wholesale invention of new jobs—jobs which are absolutely necessary to the carrying on of the war. Furthermore, labor is abnormally restless, shifting constantly in search of the fabulous wages paid in some of the war industries. There is not enough labor to do the work of two years ago as well as the war work of to-day. Hence, the old work of peace must naturally be made to suffer.

But should any industry be eliminated, especially the building industry, which is one of the greatest income sources of this country?

How would this nation be affected if building were killed? Look at the great factories turning out building supplies and the vast investment they represent! Think of the tens of thousands of workmen they employ; the millions of credit resting on that business; the many families whose whole capital and income is tied up with the building industry. How will they be affected? Many of the workers, perhaps most of them, would be finally drawn off into war industries. But that would take time and undoubtedly cause considerable hardship and suffering meanwhile.

But none of us expect this war to last forever. We all realize how easily the building business can be shut down on. And we are all capable of realizing just how long it is going to take to build up this big industry if it is eliminated now.

The building business is an elaborate organization. Its complexity is the result of a long period of growth, of brains, energy and capital that represent the very life blood of thousands. Its extermination means the breaking of builders all over the country. A scratch of the pen can kill this great business, but no scratch of the pen can build it up again once it has stood idle. To gather together the raw materials, the labor

and sales forces, the replacing of machinery, the business growth to the size of economic production—this is the work of years.

Nor can a scratch of the pen replace the wealth of the building business which makes possible the buying of Liberty Bonds and of paying taxes. Instead, an incalculably increased burden will be placed on the other portions of the population. They can't stand it. The building business must live if it is to bear its large proportion of taxes and to buy Bonds which are even more necessary for the successful prosecution of the war than is the releasing of the labor which is employed for building purposes.

It is all right to curtail building operations. The available supply of capital will take care of that automatically. But this great business should not be exterminated by legislature nor pruned to the extent of atrophy.

The country needs the building industry both to pay taxes now and to house the population after the war. Immoral and unsanitary housing conditions will be the inevitable result if the building trade is exterminated. The condition of the country now is such that we need more, not less, activity among builders.

Builders, lumber dealers, architects and all those who are close enough in touch with the working of this great industry must see that Congress realizes the incalculable harm that will result if the building business be exterminated for the duration of the war. Let Congress know the vast numbers dependent upon this essential industry. Other so-called unessential industries have proved their necessity to the public welfare. The building industry must do likewise.

Let us do all in our power to win this war. But do not let us rob this country of its industrial life blood. Let our industrial resources remain such that we can maintain and increase our commercial supremacy in the period of restoration after the war. The building industry must live if this is to be done!

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Brief Review of the Building Situation

THE most important causes for the falling off in building construction of 51 per cent, 127 cities reporting, is stated by the inspectors of various building departments to be due mainly to high cost of materials and scarcity of labor. The bad weather has also been a drawback. That materials are not likely to soon fall in price cannot be strongly emphasized. Prospective home builders and contractors should realize that a return to the old level of prices is unlikely.

A noticeable feature of the reports submitted is that repair work is more active than new construction. In Lawrence, Mass., for instance, about $35,000 was spent for repair work, while no permits were issued for new construction.

The general views seem to incline toward optimism.

CITIES IN EASTERN STATES

	December, 1917				December, 1916. New Construction, Value
	New Construction		Repairs		
	Permits	Value	Permits	Value	
Albany, N. Y.	60	$49,799	....	......	$159,625
Allentown, Pa.	9	27,225	....	......	124,915
Altoona, Pa.	6	4,313	14	$5,860	7,166
Atlantic City, N. J.	55	78,797	....	......	154,141
Auburn, N. Y.	3	5,800	....	......	14,425
Bayonne, N. J.	5	7,000	....	......	92,521
Binghamton, N. Y.	24	16,326	97	22,578	78,476
Boston, Mass.	39	381,000	138	119,000	3,320,363
Bridgeport, Conn.	30	105,430	....	......	430,335
Brockton, Mass.	7	7,825	5	2,218	53,580
Buffalo, N. Y.	177	613,900	54	70,100	1,128,700
Easton, Pa.	3	5,050	3	4,375	70,500
East Orange, N. J.	21	194,275	....	......	82,495
Elizabeth, N. J.	13	152,800	....	......	187,793
Erie, Pa.	57	180,094	....	......	132,805
Harrisburg, Pa.	8	8,030	....	......	34,175
Hartford, Conn.	38	266,450	....	......	306,017
Hoboken, N. J.	46	204,215	150	133,004	1,677,990
Manchester, N. H.	20	21,640	....	......	42,200
Newark, N. J.	121	701,860	....	......	775,223
New Bedford, Mass.	19	281,149	....	......	328,564
New Britain, Conn.	12	69,200	5	1,600	111,750
New Haven, Conn.	41	43,320	....	......	241,163
New York:					
Manhattan	13	549,000	179	1,241,655	4,022,850
Bronx	17	314,300	105	137,773	601,800
Brooklyn	631	1,915,875	....	......	3,235,474
Queens	122	1,247,820	....	......	917,855
Niagara Falls, N. Y.	20	88,780	....	......	84,560
Nutley, N. J.	..	......	1	500	11,635
Passaic, N. J.	23	15,813	....	......	341,893
Paterson, N. J.	8	14,350	....	......	68,700
Philadelphia, Pa.	95	637,995	175	102,025	5,246,605
Pittsburgh, Pa.	94	384,705	48	128,533	960,172
Portland, Me.	5	68,200	6	6,410	50,170
Reading, Pa.	9	10,400	37	14,075	88,700
Rochester, N. Y.	35	380,850	23	42,815	528,130
Scranton, Pa.	7	5,030	....	......	187,614
Springfield, Mass.	43	114,334	....	......	705,525
Stamford, Conn.	3	6,600	6	2,300	59,935
Syracuse, N. Y.	27	303,825	26	19,075	191,555
Utica, N. Y.	2	4,600	1	11,000	56,350
Wilkes-Barre, Pa.	21	29,533	....	......	65,050
Worcester, Mass.	45	39,950	....	......	463,470

CITIES IN SOUTHERN STATES

	December, 1917				December, 1916. New Construction, Value
	New Construction		Repairs		
	Permits	Value	Permits	Value	
Atlanta, Ga.	56	$185,148	64	$31,402	$146,740
Baltimore, Md.	98	261,000	....	......	1,016,633
Beaumont, Tex.	31	54,072	21	6,530	153,716
Birmingham, Ala.	25	62,450	199	33,543	216,447
Charlotte, N. C.	8	8,900	2	2,500	31,280
Chattanooga, Tenn.	29	28,273	....	......	92,730
Corpus Christi, Tex.	2	4,200	....	......	3,435
Dallas, Tex.	25	128,115	....	......	236,015
El Paso, Tex.	78	58,770	....	......	262,505
Fort Worth, Tex.	26	136,345	....	......	218,695
Huntington, W. Va.	15	50,000	....	......	466,905
Jacksonville, Fla.	36	20,955	....	......	137,625
Louisville, Ky.	28	42,120	....	......	65,200
Memphis, Tenn.	49	65,625	....	......	136,010
Miami, Fla.	53	65,300	....	......	119,215
Montgomery, Ala.	109	28,650	....	......	8,895
New Orleans, La.	22	67,480	14	13,480	241,772
Norfolk, Va.	22	37,916	....	......	107,662
Oklahoma City, Okla.	43	170,665	....	......	199,475
Richmond, Va.	12	48,475	46	37,960	361,576
San Antonio, Tex.	204	234,945	....	......	194,800
Savannah, Ga.	14	25,250	....	......	45,260
Tampa, Fla.	57	40,622	....	......	95,930
Washington, D. C.	51	399,620	124	223,045	1,288,721
Wilmington, N. C.	38	60,516	13	4,747	92,277
Wilmington, Del.	36	81,648	....	......	132,278

CITIES IN MIDDLE STATES

	December, 1917				December, 1916. New Construction, Value
	New Construction		Repairs		
	Permits	Value	Permits	Value	
Akron, Ohio	120	$1,179,150	17	$185,940	$648,115
Canton, Ohio	18	28,350	....	......	191,410
Cedar Rapids, Iowa	8	44,000	1	4,000	58,000
Chicago, Ill.	134	3,238,300	....	......	5,852,500
Cincinnati, Ohio	36	121,905	98	41,010	734,420
Cleveland, Ohio	373	1,370,280	....	......	3,080,980
Columbus, Ohio	28	119,925	27	25,855	195,020
Council Bluffs, Iowa	4	9,000	....	......	9,500
Dayton, Ohio	25	32,625	....	......	341,278
Detroit, Mich.	208	937,710	101	169,315	3,671,795
Dubuque, Iowa	2	4,050	....	......	37,600
Duluth, Minn.	23	63,170	13	47,050	107,415

CITIES IN MIDDLE STATES—(Continued)

	December, 1917				December, 1916.
	New Construction		Repairs		New Construction,
	Permits	Value	Permits	Value	Value
East St. Louis, Ill..	12	21,050	....	......	25,735
Evansville, Ind.	6	64,625	10	1,665	66,035
Fort Wayne, Ind....	12	477,810	....	......	447,975
Grand Rapids, Mich.	39	32,987	....	......	254,961
Indianapolis, Ind. ..	130	85,943	....	......	527,664
Kansas City, Kan...	11	35,425	....	......	42,865
Lincoln, Neb.	11	35,750	....	......	111,488
Milwaukee, Wis. ...	103	526,767	....	......	650,415
Minneapolis, Minn...	87	502,415	47	92,735	4,639,390
Omaha, Neb.	49	578,830	....	......	797,400
Peoria, Ill.	17	72,115	....	......	151,775
Richmond, Ind.	179	130,000	....	51,000	304,000
St. Joseph, Mo......	7	4,075	....	......	21,230
St. Louis, Mo.......	112	325,606	178	99,072	1,410,441
St. Paul, Minn......	56	175,489	....	......	1,592,875
Sioux City, Iowa	10	77,700	....	......	70,390
South Bend, Ind....	33	70,880	....	......	63,564
Superior, Wis.	36	1,264,885	....	......	10,690
Terre Haute, Ind...	4	12,900	3	21,185	83,000
Toledo, Ohio	83	126,113	....	......	441,194
Topeka, Kan.	1	125	....	......	24,380
Wichita, Kan.	54	172,260	....	......	518,975
Youngstown, Ohio ..	65	139,685	....	......	214,850

CITIES IN EXTREME WESTERN STATES

	December, 1917				December, 1916.
	New Construction		Repairs		New Construction,
	Permits	Value	Permits	Value	Value
Berkley, Cal.	40	$40,000	14	$4,750	$95,000
Boise, Idaho	..	13,080	....	3,692	1,470
Colorado Springs, Col.	11	3,020	....	......	33,025
Denver, Col.	119	213,750	....	......	299,170
Long Beach, Cal....	83	137,806	....	......	54,710
Los Angeles, Cal....	296	581,022	229	$19,221	1,355,046
Oakland, Cal.	172	333,574	83	56,465	254,482
Pasadena, Cal.	28	39,410	38	13,187	83,235
Portland, Ore.	92	45,610	124	45,675	212,700
Pueblo, Col.	26	10,761	....	......	41,274
Salt Lake City, Utah.	56	215,800	....	......	212,925
San Diego, Cal.....	27	45,530	64	13,515	30,655
San Francisco, Cal..	63	391,864	275	89,954	1,239,625
San José, Cal.......	35	33,075	....	......	22,227
Seattle, Wash.	514	545,055	222	71,645	445,290
Spokane, Wash.	27	259,265	11	19,500	27,685
Stockton, Cal.	38	38,418	....	......	81,480
Tacoma, Wash.	26	34,625	46	2,678	14,135

Some Advantages of the Two-Family House*

IT seems to me that a good fundamental proposition in starting a housing project is to have it so designed as to make it possible for a tenant of ordinary industry to easily acquire the ownership of a house, and among this class of people there exists a strong desire to own a building in which one or two tenements can be rented to others so that the owner is enabled to get his own housing expense down to a very low figure.

This desire on the part of the tenants is partly responsible for the "triple-decker" evil which has ruined so many suburbs of Boston, and it is highly desirable to provide a better means of meeting this demand. If the building contains too many tenements, it is naturally too expensive a proposition for the small owner, but a double house of two tenements offers a type of home not impossible of acquiring by the worker of moderate means, while at the same time it provides an income-producing investment.

Of course it is evident that in many cases the value of the land compels the construction of houses in blocks. The interior houses in such blocks evidently cannot get the desired exposure to air and sun, but a double house can have each tenement exposed on three sides, and each can have its own side entrance and path to its backyard without passing the rear of any other tenement. The single house is theoretically, I admit, the ideal type, but I have found that it is slightly more expensive to build, requires more land and, while eagerly sought by renters, is much more difficult to sell, and on account of the impossibility of obtaining long horizontal lines is less attractive architecturally and forms a less dignified architectural unit than the double or semi-detached cottage.

In our Salem experiment we built two types of houses, one having a front sitting-room and rear kitchen on the first floor and the chambers and bath upstairs; the other with large combination kitchen, living and dining-room at the front of the house with a chamber and bathroom opening out of it at the rear and with other chambers upstairs.

Compactness is an important quality of planning. The plumbing must be reduced to the shortest possible lines and the bathroom ought to be either adjoining or directly over the kitchen so as to get the benefit of all the heat for the hot water. As no furnace is supposed for the house, the chimney may well be disposed so as to pass by the wall of the bathroom and, in fact, the hot water tank may often be located in it. If there is a possibility of half the house passing to a separate ownership, the plumbing systems should be kept separate, otherwise money may be saved by running them on the same stack. Sinks should be 33 in. from the floor and supported on brackets instead of legs.

Space for the refrigerator adjoining the back door should always be provided, with a proper drain, so as to avoid the waste of ice caused by keeping it in the kitchen.

Stairs, I think, should lead directly from the front door rather than from the living-room, and in a double house by all means keep the front doors of the two houses separated, as for sitting out purposes on hot nights the combination front stoop for two families is a most decided objection. This, however, involves placing the stairs at the end of the building, so that the front room cannot have windows on two sides; but, on the other hand, it implies a well-lighted and airy stairway, a feature which certainly appeals to the imagination.

The cellar should have a direct outside entrance, if possible, or at least should be reached without entering the main portion of the house. This is accomplished in some of our houses by making a small side entry, with the refrigerator at one side of the door and the stairs to the cellar going down on the other side, thus being convenient to both the kitchen and the outside. The cellar should be concreted and have a few shelves, etc.

The kitchen must have accommodations for the simple stock of groceries to be kept on hand, either in a pantry closet or a cabinet of some sort, and should have painted walls. Laundry tubs may be provided in connection with the kitchen sink. The walls are painted in oil and the floor is oiled. If there is a sitting-room, doors or windows must always be of a size to admit a piano, for, if not, every tenant will surely possess one. Fireplaces will probably be beyond the cost limit, but a shelf like a mantel shelf is sure to be a convenience.

The subject of bedrooms brings up the question of size. The legal size of 90 sq. ft. for tenement bedrooms is about all that can be provided under the circumstances.

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*Extracts from an article in *Building Management* by Walter H. Kilham of the Boston architectural firm of Kilham & Hopkins.

BUILDING AGE

THE DEALER'S DEPARTMENT

More Business for the Dealer

By the Old Retailer

THE building business, like everything else, is subject to changes, and it is becoming apparent that some of the old ideas and methods are gradually giving way to the substitution of others that have been evolved by the stimulating forces of efficiency and competition. These changes in the business are also bringing changes in the relations of the building material retailer and the contractor.

The old idea of the retailer confining himself solely to the selling of the materials has undergone a change within the last few years and the scope of his agencies has been enlarged to the taking in of those things which formerly was considered as belonging to the contractor. This is having the effect of giving him a degree of independence of the contractor that he never before has had. The general custom has been to figure and sell the itemized bill as it has been made out by the contractor, who usually peddled it around and bought it to his own best advantage. This, in a way, made him independent of the individual dealer in so far as determining the sale of the bill was concerned. This custom still prevails to an almost universal extent, especially in the cities, where it probably is destined to continue indefinitely unless the character of building conditions changes materially in those places. But out in the country districts a change has set in that tends to materially affect the old-time relations between the building material merchant and the contractor.

The plan book system and the policy of selling the completed building to the customer has been adopted by a large and an increasing number of the more progressive dealers in these farming communities. This, and the adoption also by some of the policy of "One Price to All" will undoubtedly spread among the lumber dealers as their successful operation becomes better known. The general custom has been that when people wanted to build, they went first to the contractor and consulted with him about plans and the probable cost. After a plan had been sketched out that suited the parties, the contractor made out an itemized bill of materials and submitted it to the lumber dealers for an estimate. Then he got bids on the cost of the mason work, plastering, painting, and hardware. Upon the basis of the cost figures of these several bills, he contracted with the owner for the erection and completion of the building for a certain stated sum. The final cost, however, varied with the degree of accuracy of the several estimates, and, as is well known, the average contractor's contract for furnishing the whole seldom was sufficient. Of course, the owner had to stand for the additional cost. This system worked well enough where the contractor was competent to estimate the cost correctly and honest in carrying out his contract, but he, too, was subject to the competition of others who wanted the job and this rivalry usually had the effect of trimming down estimates so closely that deficiencies of material became the general rule. In fact, the ignorance of the general public concerning building matters served as a temptation to a certain class of contractors to make out low estimates in the first place for the purpose of being lower than competition and thus securing the job. They knew that when the building got well under way the owner would have to see it through and finally have to pay for the bill of extras. In such cases the owner is a good deal to blame, for, in his desire to build as cheaply as possible he allows himself to overlook the elements of competency and responsibility in his giving the contract to such men. Any mechanic who sets up as a contractor is a contractor to them and is presumed to know his business. All are alike to them until by experience they learn the difference.

Many Dealers in small towns are getting building contracts. They are making use of plan service and selling the house complete instead of wasting time and money figuring on bills of materials peddled around by contractors.

This article points out how both the lumber dealer and the contractor can increase their individual efficiency and shows how better business conditions for both can be secured.

You understand, of course, this way of doing chiefly violates the common custom where there is no professional architect to draw the plans and superintend the letting of the contract and erection of the buildings. The prevalence of this custom has given the country contractor the position of being the intermediary between the building material dealer and the party wanting to build. This has given him the option of diverting business to whichever dealer he chooses to deal with at his own advantage after securing a contract on the basis of an estimate given him by a dealer. He can compel that dealer to enter into competition with other dealers for the sale of that bill, and it is not an uncommon thing for this to be done.

As the contractor receives no pay for his time and knowledge in preparing and giving his estimate to the owner, neither does he consider himself obligated to buy the bill of a dealer who has simply given him a basis to figure on. There's a difference between an estimate bid and a sale bid, as many a lumber dealer has found out to his disgust and disappointment. He has had to submit to this and many other disagreeable things in order not to lose the contractor's business. He has to do it now, particularly in the cities, where he seldom sells materials to the consumer direct. His sales are to the contractors, and they in turn sell the lumber to the consumer with another percentage of profit.

It may have been only a coincidence that the plan-book system was introduced among the country lumber dealers at about the time when the ready-cut-house concerns began to make their competition felt by the lumbermen. I am inclined to think, however, that the widely distributed literature of these concerns

was largely responsible for the efforts of the retail lumber industry to counteract their influence by devising the system of furnishing plans and specifications and contracting to furnish all materials for a house at a specified sum. This has had the effect of developing the present enormous amount of building plan literature that is being published by various interested concerns all over the country. There is scarcely a household but what receives more or less of this house plan information literature. As a natural result the American people are being educated in their tastes for a better class of Home Architecture than has been the rule in the past.

The National Lumber Manufacturers' Association has gone into the matter on a wholesale scale and is furnishing the retail dealers with quantities of different plans for various styles of houses and other buildings that are common to the farm. Other associations are doing the same thing by way of advertising their particular kind of lumber. The manufacturers of other building materials are likewise alive to the opportunity of advertising their products in the same educationally attractive way. All of these plans have been studied out and drawn by the professional architect, and the working details of them together with full specifications can be obtained at a trifling expense. The cost of the materials can be figured by any competent dealer and the total cost of the building will vary only according to prevailing conditions in the various localities. Instead of the contractor being, as he has been, the source of building information for the community, the local lumber dealer will in a large degree take his place and thereby become more independent of the contractor. When people can go to the lumber office and select their choice of a house plan from a hundred or more of different styles and sizes and at the same time obtain a definite knowledge of the ultimate cost it's a fair supposition they will prefer it to going to a man who is not equipped to give them any but a general idea of the approximate expenditure.

As this new service by the lumber retailers becomes more general there is a possibility of its being extended so as to include contracting for the entire building, labor included. It is a natural corollary of the proposition to guarantee the cost that the lumber dealer should have control of the labor cost on the buildings which in these days is no inconsiderable item. The writer does not think, however, that this will ever obtain a general practice among the retail lumber men.

Some concerns with ample capital may be induced to take up contracting and make it a part of their business. They could employ on a yearly salary a qualified building mechanic to have charge of all the construction work and act as general superintendent of the building operations.

One of the large line yard concerns has extended its building plan service by having several professional architects in their employ the year round for the purpose of giving personal service to those who are talking about building. If a party wants to build a house and cannot find a plan that suits him, the company architect confers with him and eventually works out for him a plan and cost to his satisfaction. This same concern also has adopted and is successfully carrying out the policy of "One Price to All." As it makes no discrimination in prices of material to any one, there is not much chance for the individual contractor in the places where this concern has yards so far as his contracting to furnish materials is concerned, while these line yard peoples have not as yet gone in for contracting to sell the completed building. It is obvious, though, that it is the logical outgrowth of a further extension of their enlarged building plan service.

The readers of this article will please understand that the writer is not telling things in the sense of advocating their adoption. He is simply giving you information of what is now being done right along in the retail lumber business. This information is for the benefit of both the building material dealer and the contractor.

The intelligent and progressive-minded contractor will readily see that the trend of things is working against his business, and therefore it is up to him to adjust himself accordingly. The invited was once a contractor himself, and he knows what it means to the business for people to go to the lumber yard for building information and obtaining plans for what they want to build, but there is little use in trying to ignore the changes which progress brings to every line of business. It is not sensible to "kick" against what is seen as accomplished facts. There is no question but that the contractor will, in some degree, always be a necessary factor in the building business. As before remarked, his operations will be largely confined to the larger centers of population, and at the present time he still has the privilege of contracting for the work in those towns where the dealers give building plans service. It also will be a number of years yet before a great majority of the lumber dealers will adopt it.

With this prospect in view, it would seem desirable that the intelligent contractor should direct his efforts toward preserving his position in the business by increasing his own efficiency pertaining to his trade and a better knowledge of his business. There is no denying the fact that he is vitally interested in the using of lumber, more so perhaps than in any other building material.

Reference is not had, however, to contractors of those buildings put up with other materials, but it is undoubtedly true that lumber will be the chief building material in this country for many years to come. Therefore, what we say is based on present conditions and their likelihood of continuing. It is obvious then that it should be to the best interest of the contractor to co-ordinate his efforts with those of the lumber dealer to raise the standard for better building service to the consumer, and to work with, rather than against, him. Where there is a reciprocity between dealer and contractors in a town there is little desire for a change on the part of the dealer. It is also important for the existence of such harmonious relations, because of the growing competition of the manufacturing and selling of ready-cut houses and other buildings direct to the consumer. This competition naturally decreases the value of the contractor's service and relegates him to the position of the common workman. Therefore, it increases the necessity for him to join hands with the lumberman in the meeting of this competition, and in so doing he can make more money for himself than by attempting to act independently.

As a rule, country town contractors are deficient in the knowledge of the more modern house plans with their improved methods of lighting, sanitation, ventilation, etc. So is the average lumber dealer. The contractor, therefore, should make himself better acquainted with these things so as to be able to make his assistance more valuable to the dealer. The dealer and contractor are working partners, though they don't often act that way to each other, and both are to blame for it.

What they need is to understand each other better. I believe this could be made possible by their getting together in a social way. I think it would pay any dealer to occasionally invite the contractors and mechanics in the town to a dinner at the hotel, and in the atmosphere of friendly sociability they could discuss matters of common interest to them in their business. It wouldn't harm anything if all the dealers in the town would unite in giving this entertainment. It would serve to take the edge off competition and do away with the dodging of each other on the street.

The lumber dealers have their conventions every year, where the dealer in a town is a member of the association. It would be an act of good business to take one of his contractors along with him. He could alternate with others each year so that all could have a chance to get the pleasure and benefit of these meetings. This, I know, has been done in many instances with satisfactory results. Anyone can judge for himself the nature of the benefit this would be to the contractor and what it would mean to the dealer also afterward.

This is a practical common sense way of dealing with a class of men who are an essential element in the building business. Getting together is the best remedy I know of for ill-feeling, misunderstanding and cut-throat competition.

What Is the Outlook for 1918?

Will Prices Be Lower? Is Increased Activity Likely? What a Large Firm of Contractors and a Lumber Firm Forecast

From J. R. Ralph, secretary of J. L. Robinson Company, General Contractors, Minneapolis, Minn.—We have given these questions a great deal of thought, and are firmly convinced that there will be no material decrease in the cost of building operations for the next five years at least. In our opinion, there will be no improvement in the labor situation until some readjustment is made after the close of the war. There will be too much demand for steel products to make any appreciable reduction in the price. The lumber stock is getting pretty well depleted in our location, so we can see no chance for any reduction, and would expect an advance in this line. We believe that cement might, perhaps, be cheaper, but this would be a small item in the cost of a building. So, in view of the above, we would advise anyone contemplating building not to wait for cheaper prices.

Regarding building activities during 1918, we must naturally expect that this will be greatly curtailed, except building operations made necessary directly or indirectly by the war. From the present outlook it will be more noticeable in the Middle West than elsewhere, for the reason that the Government has not seen fit to let as many contracts for war materials in this locality.

Aside from this particular line of building, we must all realize that the Government comes first all the time, and must have priority, but we believe it to be a mistake to advocate stopping of building entirely. Let us go ahead with building as nearly normal as possible, giving employment to as many as we can, and keeping money in circulation where it belongs. There is always a happy medium between two extremes, which in most cases is best to follow.

From Edward Hines Lumber Co., Chicago, Ill.—A brief review of the conditions that have obtained throughout the year past will suffice for our purposes in reaching some conclusions at least pertaining to the prospects for the New Year and provide a tangible working basis upon which to proceed with our work for the ensuing year.

In a little talk issued early in January of last year we referred to the strong likelihood of an unusual demand for lumber in new channels which would in a large measure offset any losses occasioned by a cessation of building operations or other work. We also commented at some length upon the seriousness of a likely car shortage and the consequent troubles of getting lumber from the more remote sources of supply, in seasonable time for urgent needs. Labor problems were also touched upon and offered as additional reasons why changes both in supply and demand might be looked for as compensating influences to be reckoned with in our contemplation of the future. The causes, likewise the effect, have all been magnified by our own active participation in war and the necessary preparations that have been made since a declaration of war was issued by the United States Government. Labor troubles multiplied and inversely building operations suffered, especially in the larger commercial centers of the United States. The new and unlooked-for developments brought about through our country's need for preparedness made additional demands upon our resources for supplies for the erection of cantonments and the great ship-building program of the Government, etc., and the law of compensation has worked out its inscrutable decrees with unfailing accuracy. There have been one or two intervals during which there were slight recessions in values, but these "pockets," so to speak, were of short duration and the recovery of values to the higher levels previously reached soon took place, and new and higher levels have since been established and maintained.

It is reasonable to assume that where there may be losses in demand in some instances there may be also compensating gains made in other channels. For the smaller demand there is sure to be a reduced supply. Labor troubles have but commenced and there will be serious problems for us all to solve. The log supply in the areas of lumbering operations throughout Michigan, Wisconsin, Minnesota, Canada, the Inland Empire and everywhere on the Pacific Coast has been appreciably curtailed because of an inadequate supply of labor and these losses cannot possibly be recovered. The shipbuilding program of the United States Government and the still further need for lumber with which to construct necessary shelter for our soldiers and those of the Allies abroad shall continue to consume enormous quantities of lumber for another year at least. Home consumption of lumber for crating and boxing purposes must go on with largely increased demands upon the mills. All low grade lumber of every description must therefore be utilized. The larger and longer timbers, both in long leaf yellow pine and fir, for shipbuilding, and the better qualities of fir and spruce for airplane stock, cannot possibly be produced in quantities in excess of urgent emergency needs.

The building business, especially in the larger cities, does not hold forth much promise so long as war lasts. Much of this class of construction is of a speculative character and therefore depends largely upon available loans of money with which to carry on operations. It is not likely that there will be much inclination on the part of financial institutions or individuals to divert money to these channels so long as industrial and other demands may continue to use funds. The relatively higher costs of labor and all materials of which lumber is decidedly the least expensive will have a marked tendency to retard improvements of this character.

In the smaller cities and throughout the agricultural localities of the United States indications are more favorable for a fairly active demand for lumber for building purposes. The crops have been unusually good and have brought excellent pecuniary returns to the farmers. There is no derth of ready cash in these communities and the inclination is to make improvements, rather than to delay them. From this source there is every reasonable indication of a healthful demand for lumber.

It is necessary to work with a view to getting new business, where previously there may have been little or no demands for lumber. These new requirements are the very compensations we have referred to as offering the needed outlet for lumber not used in the usual channels of trade. For instance, silo manufacturers have been relying considerably upon fir for much of the wooden silo requirements in the past. The practical utility of fir in the better quality for airplane work has caused the Government to place an embargo on all shipments of this wood for other purposes. During the few months past we have been selling larch, hemlock and long leaf yellow pine for silo purposes in quantities far in excess of our expectations.

In a general sort of a way, in view of the fact that both in hardwoods and softwoods, more lumber was shipped during 1917 than was manufactured, we feel that with the somewhat smaller supply of dry lumber now on hand and the further likelihood that labor troubles are going to interfere with our operations even more than they have prospects for a firm lumber market are reasonably good at least.

We do not look for any larger building operations in the cities, i. e., not approaching normal conditions, but if the coming months of this year are to be judged by those of 1917 it will be well that there is not so great a demand for building requirements as otherwise lumber could not be had in seasonable time.

Impressions of a "Building Age" Traveler

What a Dealer in One Small Town Has Done to Build Up a Flourishing Business

IT may be interesting to some of the readers to know that L. P. Butts of Oneonta, N. Y., in addition to being chairman of the home defense committee and president of the local automobile club, helps his wife, who is president of the Oneonta Red Cross and incidentally conducts the largest wholesale and retail builders' supply business in that part of the State. Mr. Butts is an enthusiast, and gives his best to everything in which he is interested. He is particularly enthusiastic about Oneonta, its past, present and future.

"Why," he said, "Oneonta is the only town within a radius of 60 miles which has increased in population during the past 50 years. It has quadrupled in that time and become the financial and business center for four of the largest counties in New York. Our farms during the past decade, through the assistance of the State Board of Agriculture, and the initiative of the farmers themselves, are being conducted along practical and profitable lines. Oneonta is the center of the greatest wealth-producing region within two hundred miles of New York City."

This was explanatory of what Mr. Butts had to say relative to building conditions and the distribution of building supplies throughout this section. He went on to say that the farmers kept their buildings in good shape and that the small towns were made up of good substantial homes; that the demand in the aggregate was of good volume, but that the wide distribution and the absence of large distributing centers made it necessary to accommodate the local dealer with mixed car shipments. This, he said, in a way helped the jobbing end.

I explained what BUILDING AGE purposes to do for the retailer of building supplies, and asked whether or not such service would be of benefit to the dealers and appreciated by them.

"That depends," said he, "upon how you present it to them and what you really give them. I was a road salesman for ten years before I went into this business and I still make it a practice to get out and see my customers whenever possible. It is surprising to see how some of the best dealers will permit useless expense and waste, overlook chances for profit or underestimate expense.

"Only recently I called upon a dealer who was delivering cement to a customer. I asked him what he had added for delivery and he said fifty cents a ton. Just for my own satisfaction I timed the delivery of a two-ton load. It took just two hours from the time the wagon was in place to be loaded until it was back in place for the next load. In other words, this dealer was getting fifty cents an hour for the time of two men, two horses and the depreciation on wagon and harness. All the profit on the sale was being eaten up through the loss on delivery and the dealer didn't know why he wasn't making any money.

"This is only one of the many ways in which the best dealers are losing out. We all need just such service as you propose. Why, it took me five years to find out how to spend money profitably in local advertising. I think I have it solved now, but it would have saved me several thousand dollars if there had been some way for me to learn this through the advice and experience of others instead of through paying bills for advertising which was doing me no good."

I then explained the influence BUILDING AGE would exert in making the contractor a better customer for the dealer, in reply to which Mr. Butts said:

"If you produce a publication of that kind, not only should every dealer become a subscriber and a reader, but he should interest himself in seeing that every contractor becomes a subscriber, also. That is just what the industry needs, and I hope you make a big success of it."

In the conduct of his own business Mr. Butts lays great stress upon the importance of every employee making a study of all phases of the business. He is at all times on the lookout for information in various publications, etc., and marks interesting and instructive articles which are passed around for all to read. He insists upon courtesy, not only as an asset but as a means of making work more pleasant and interesting.

Politically, this district is normally Republican by 2500 majority. Mr. Butts was elected State assemblyman on the Democratic ticket. This may indicate to some that he is a good politician. Maybe he is; I don't know; but this reference is not made to illustrate that point, because the business man who has the privilege of a heart-to-heart talk with him will realize that this result was due more to good business methods and superior salesmanship than to his qualifications as a politician. Oneonta is not a large city, but it serves a big territory in building supplies in a big way through L. P. Butts.

What Is Meant by "Keeping Store"

Three Classes of Retail Lumber Dealers Analyzed

To Which Class Do You Belong?

By E. E. Bell

WHILE on an auto trip with a friend several weeks ago, a stop to replenish the supply of gasoline was made at a hardware store in a small town. Incidentally my friend thought to make purchase of several standard articles which it was natural to suppose would be found in the stock of every cross-roads hardware or general store. Inquiry for each item, however, brought the same reply: "We don't keep that." Finally my friend said in disgust: "Well, what do you keep?" In reply to which the proprietor said, "I keep a hardware store."

This conversation, the annoyance of my friend, the indifferent placidity of the owner of the place, although somewhat amusing, appealed to me from my knowledge of rural merchandising as typical of a deplorable condition far too prevalent. It represents in no small proportion the attitude of the small town merchant in every line.

It brought to mind, in fact, an expression which I have heard in many rural sections. So and so "keeps store," or someone else "keeps" a lumber yard, etc. What does he want to keep it for and what does he keep in it? Better far the attitude implied in the reply of the over-bright boy in the hardware store who when asked if they kept nails, said: "No, we don't keep 'em, we sell 'em." When you stop to consider the absence of any effort to sell on the part of far too many small-town merchants, it is easy to understand how the expression he "keeps store" came into use.

In applying this thought to retail lumber dealers, three classifications resulted. The man who carries a limited stock of standard sizes and grades only, and drives those who would buy of him elsewhere because he cannot supply the assortment they may need. This man isn't really a dealer or a merchant, he just "keeps" a lumber yard. He may think he's in business, but he isn't. About all business means to him is a place to go so he doesn't have to stay around the house all day. Yes, he "keeps" lumber, the quantity depending almost entirely upon how much he happened to buy, because there is no good reason so far as his effort is concerned, why he shouldn't continue to "keep" the greater part of all he gets in.

The next fellow grades up a little in that he really tries to have in stock whatever his customer may want. If someone comes along and wants to buy something he doesn't have in stock he'll try to get it. He doesn't make any effort, however, to find out in advance what may be needed and put it in stock so that he has it on hand when the buyer comes along. Consequently he is always a lap behind, as his customer has gone to the real merchant dealer and made his purchase before this fellow can get the goods in. But he'll have it on hand for the next fellow who comes along. This man may be a dealer, but he isn't a merchant. He doesn't *sell* anything, he only "keeps" it so that he may have it on hand if someone insists upon *buying*.

Then there is a third class who really are merchants. Who don't "keep" things, but sell them. They find out not only what the trade in their territory may happen to want, but what it should have. Then they go out and sell it by pointing out the advantages in using certain materials and creating a demand for them. They have gotten past the point of thinking lumber is the only thing that can be used for building and are making a profit out of building specialties and supplies generally. They are, in fact, conducting a general ferchandising business in lumber and everything else which goes into building construction and their profits at the end of the year supply an excellent reason for being in business.

Another fact worthy of notice is that this third class, these real merchant dealers, are not complaining about competition, sales direct, mail-order houses or anything else except lack of time to do everything they would like to do. The reason is simple; they don't "keep" a lumber yard, they don't simply stock what may be called for and wait for someone to come and buy it; they find out what the trade should have and then go out and sell it. They apply the same principles, brains and energy which make the big department store and mail-order house a success, and they win.

To which class do you belong, Mr. Dealer? Do you simply "keep" a lumber yard, or are you conducting a real merchandising business in those things needed in building construction? Your attitude on this question will not only determine your future profit, but may decide whether you will be in business at all or not within a few years.

Are you going to sit down and simply "keep" a lumber yard while some dealer from an adjoining town gets the trade which rightfully belongs to you? The mail-order house gets very few orders from the territory where the real merchant gets there first with modern selling methods. The manufacturer doesn't sell direct in territory where a good live dealer merchant is getting his full share of the business.

Advertise Your Building Materials Business in the Movie Program

Some Excellent Suggestions Which the Progressive Retail Dealer Cannot Afford to Ignore

By Ernest A. Dench

TO obtain the great possible results from motion picture slide advertising there must be an effective follow-up medium. You may have gotten the hunch that it is quite sufficient to change your slide frequently. As a matter of fact, only half of the battle is won, for it is like advertising in street cars, or on billboards, and then neglecting to take display space in the newspapers.

The Slide Is Not Elastic Enough

The slide is not sufficiently elastic to perform everything demanded of it. At the photoplay theater your slide is probably one of a dozen or more, and it is well nigh impossible to retain a vivid recollection of them all. You have to remind the spectator and, incidentally, present the direct appeal. It may at first occur to you to use the columns of the best newspaper in town, and while this has its good points, it nevertheless falls short of the type of follow-up medium necessary for slide publicity.

100 per Cent Return on the Investment

The newspaper, as a rule, covers a town like a blanket, but the neighborhood theater, on the other hand, draws the majority of its patrons from the surrounding blocks. So if it is your desire—and I assume it is—to obtain one-hundred per cent returns from your investment, it is up to you, to employ the house organ or program, which reaches the theater's patrons every week as regularly as clockwork.

The Mistake Made by Dealers

The grave mistake some building materials dealers make at this stage is to forsake the slide for the house organ. It may be an economical plan on the surface, but, believe me, it invariably proves disadvantageous in the long run. The slide serves to get acquainted with your prospects, who cannot possibly ignore it in the darkened hall, so you secuse their attention where the printed page would probably escape their notice.

The theater program has one advantage over the slide—it reaches irregular patrons. Almost every exhibitor possesses a mailing list, and to be included on same the patron has only to hand in her name and address to the girl in the pay box. The publication is generally mailed to reach patrons on Mondays and contains the program for the current week. The more discriminating patron studies it carefully in order to ascertain whether there are any pictures that he or she would like to see. If there are none, he temporarily transfers his patronage to another theater. This means that your slide is missed by some patrons, but if the house organ is interesting, that is, filled with live matter from cover to cover, including the advertisements, it will be carefully read and passed on to other members of the household. For this reason, if for no other, the movie program as an advertising medium should not be overlooked.

One appropriate program announcement I came across the other day was as follows:

> **THE MAN THAT RENOVATED, REDECORATED AND MADE THE TRIANGLE THEATER AMERICA'S PRETTIEST THEATER IN FIFTEEN DAYS**
>
> JOSEPH LACOV
> **General Contractor**
> **824 Kenmore Place**

There are two types of motion picture exhibitors —those who believe in obtaining as much advertising as possible from local traders—and those who under no circumstances will carry beyond a certain amount of paid copy. The first type will probably accept a dollar per inch for his space and fill up almost the entire space with his advertisers' announcements, to the exclusion of reading matter, with the possible exception of his program schedule. This kind of house organ is inefficient, in that it is destined for the waste basket or the sidewalk, after a skimming of the pages.

But the exhibitor who takes an honest pride in the "make-up" of his house organ will ask $2 per inch, and he is quite justified in making the charge, since it allows him to hold the attention of readers with interesting stuff. He will plan his pages so that reading matter is flanked with advertisements, over which he acts as his own

censor. Nothing must be out of harmony with his well-defined policy, and the result is one-hundred per cent efficiency.

Offer Some Inducements

At the left side was a photograph of Mr. Lacov.

Why not offer some inducement to photoplay patrons so that they will not give your program announcements the once-over? By this, I do not mean to imply that the majority do not read the theater house organ from cover to cover, but it is really remarkable what a stimulant of some kind will accomplish in the all-important matter of arousing peope to action.

The Misspelled Advertisement

And without a doubt the most effective stunt in this connection is the misspelled advertisement. The plan cannot be operated by a building materials dealer without the co-operation of other advertisers, but the motion picture exhibitor will gladly take care of the details. The showman usually causes four errors in as many advertisements to be made and the correct answers are kept in a sealed envelope until the contest closes. Each person entering the contest writes the answers on the program itself, backed up by his or her name and address, after which he or she hands it over to the pay-box girl. As many correct answers are received in nine cases out of ten, the first ten correct letters opened are awarded the prizes. The winners are allowed to purchase building materials up to a certain amount, provided they pay for the labor involved, and make purchases with the remaining advertisers—all without cost, of course.

Reduced Size of the House

Motion picture exhibitors, in common with publishers in general, have felt the pinch of the increased cost of paper, ink and other printing materials. Not a few theaters that formerly distributed house organs up to twenty pages, now seldom issue them with more than eight pages. Some even comprise four smaller pages minus the outside advertising they formerly carried. The survival of the fittest holds good in the present case, for far too many exhibitors sold their advertising space for less than what it cost them. Because of their quantity rather than quality policy, they lacked the courage to charge more when the time came—or, perhaps, they knew their program was so poorly gotten up that it wasn't worth more. Anyway, the building materials dealer should pay the increased price with the knowledge that it is worth it.

How Motor Trucks Compare with Teams

*By M. B. Eutsler**

OWING to the unsettled condition of the country generally, and the increased cost of doing business, it is natural that the retail lumber dealer has been, and still is, doing quite a lot of figuring on the subject of overhead expense. There are a number of items to be considered to arrive at the proper cost of handling lumber at retail, but the item foremost in my mind is the cost of delivery to the trade.

Cincinnati Dealers Use Both Team and Motor Delivery

Practically all of the dealers here in Cincinnati use both the old and new method of delivery, meaning, of course, team and motor delivery. The question has been brought up a number of times in our local meetings to ascertain which of the two mentioned deliveries proved the cheapest and most efficient, with the result slightly in favor of the team. I learn, however, upon close investigation of the matter that there is a truck for every delivery, and that the conclusions reached in our general discussions were not altogether correct.

For example, I give you figures submitted by one of the largest retail sash and door concerns in the country, covering a period of three years. It seems that this company has been very diligent in keeping its cost accounts, and according to its report the teams have slightly the better showing, they having cost $3,228.10, as compared to $3,714.82 for the trucks for the same period, and for delivery of practically the same amount of stock.

It is, of course, understood that the above figures do not cover the original investment, either in teams or trucks, but cover only the actual cost of maintenance and operation.

Truck Mileage Double That of Teams

Now, while it is true that the teams delivered as much stock as the trucks at a little less cost, it develops, in running the matter down, that the mileage covered by the trucks was nearly double that of the teams; therefore I maintain, notwithstanding the actual amount of money paid out, that the best results were obtained from the trucks.

First, because, had the teams been compelled

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*Secretary Cincinnati Retail Lumber Dealers' Club

to make the long deliveries made by the trucks they would have been able to deliver only about one-half the amount of stock; and besides, the cost on the long haul would have been proportionately more because of lack of speed by the teams, thereby necessitating fewer deliveries at a higher cost.

Again, I find in a number of cases that the style and capacity of the truck are not adapted to and not intended for the purpose for which the truck is used. One dealer with whom I am familiar, and who has his deliveries on the most efficient and scientific basis, uses nothing but trucks, but he uses them the way they were intended to be used.

For instance, he operates a 5-ton truck for his heaviest deliveries, a 2½-ton for medium deliveries, and a 1½-ton truck for light and general utility work. Up until three years ago this company used nothing but teams, and was satisfied that it was getting the best results obtainable; but since adopting the trucks, and using them constantly for three years, nothing could induce the company to return to "old Dobbin."

Dealers Should Give Truck Delivery an Impartial Trial

I think the experience of this particular company is true of all. There are numbers of them who, having never tried motor delivery, are satisfied, and yet, could they be persuaded to give the truck delivery an impartial trial, would undoubtedly meet with the same success as the up-to-the-minute company referred to above. I find, too, that a goodly number are not installing trucks on account of the initial investment.

While it is true that a good truck will cost slightly more than two good teams, it will, as demonstrated by the sash and door company, cover double the mileage; therefore, the original investment is less in proportion to results obtained than the teams.

I conclude, therefore, by saying that from an economic, efficient and patriotic point of view, it is to your best interests, Mr. Retailer, to motorize your business.

AS SEEN BY THE MAN ON THE ROOF

CONSERVATION

"Is your wife cutting anything out?"
"Yes, a new dress."

THE USUAL ANSWER

Dealer—I see that one of your helpers has enlisted in the army.

Mason—Yes, and if they ever send him after the Germans he will come back and say he couldn't find 'em.

BUT THE TENANTS WILL

Stenographer—The boss is going to offer a prize of five dollars for the best name suggested for that new apartment building.

Bookkeeper—I suppose he couldn't use any of those he called it while he was building it.

SIMPLE, WHEN YOU UNDERSTAND IT

A large blueprint, covered with a mass of straight and curved and dotted lines, figures and symbols, had been found on a prisoner, and was now being examined critically by the chief of the secret service and his assistants; but they were unable to make it out.

"It looks to me," said the chief, "like it was the groundplan of one of our large munitions plants. You observe that here is the main building, here the magazines and storage warehouses, the railroads running into the plant here, and here the tenements where the employees are housed. However, we will call in Jones, one of our men who used to be in the building business and had to work from a good many of these things. Hey, Jones!"

Jones came in, and the blueprint was spread out before him. "It is somewhat intricate," said the chief, "but maybe you can tell us what it is."

"Easy," replied Jones. "It's an architect's drawing of a dormer window."

WHEN YOU'RE DOWN

When you're down on your luck
And the bottom you've struck,
When you're down to the hardpan of earth,
When you're slipping a bit
And at last you have lit
Where there isn't much music or mirth,
Then remember, my lad,
That when matters are bad
They are often beginning to mend—
That the good things at first
Often came to the worst,
And it all will be right in the end.

So hang on like a pup;
Don't you ever give up;
Don't you say you are beaten and through;
So hang on like a man
To your purpose, your plan,
And just say you will do it, and do.
When you're slipping a bit,
And the bottom you've hit,
Pull the harder, with every ounce.
You may slip some again
But keep kicking, and then
When you get to the bottom you'll bounce!

CEMENTING THE TIES

Pastor—That cement block manufacturer would like to have the choir sing something appropriate at his wedding.

Leader—Why not "Little drops of water, little grains of sand"?

THE PLEASURE IS ALL HIS

The Man Next Door—I see that a leading automobile manufacturer has quit making pleasure cars until after the war.

The Man Who Owns One—I didn't know he ever made any.

THEY'LL NEED IT

"What do you suppose the kaiser is thinking of, anyway?"

"I guess he is trying to start a building boom in Europe."

CAL, THE CARPENTER, SAYS:

A jack-of-all-trades seldom takes a ten-spot.

The old days weren't better—you were younger.

The first man up a ladder didn't start on the run.

"Within easy walking distance" covers a multitude of real estate.

We always seem to do the most work for the least money.

Treat a lie like a nail: Find the head and nail it.

Just when some fellows are within striking distance of a better job they strike.

Trying to get rich quick is like hammering a screw instead of driving it.

Starting a bad habit is like a split in the end of a board.

It's a good veneer that isn't swelled by moisture and a good man by flattery.

I used to know a one-armed paperhanger, and I still wonder how he did it.

Probably Eve was as excited over Eden as the bride over the new bungalow—but no more.

There is nothing in life as pleasant as memory—unless you are charging off some bad accounts.

When some well-dressed guy looks down on me I remember the relative usefulness of wall-paper and tar.

When a woman cries or a man lights his pipe the other side of the argument is licked.

Pick fruit as soon as it is ripe, and bank a check as soon as you get it.

The man who comes within an ace of something forgets that next to the ace is the deuce.

My boy has asked me to give him an allowance; I was glad when my dad allowed me Saturday afternoon.

There is only one thing to do with a sliver in your hand or a kicker in your crew.

New Equipment That Will Interest Builders

A FLOOR surfacer for use on floors of cement, composition, marble, mosaic, terrazzo, etc., is shown in Fig. 1. It is called the American Heavy Duty Floor Surfacer, and is manufactured by the American Floor Surfacing Machine Company, 521 South St. Clair Street, Toledo, Ohio. The feature of this machine is a double disc, which is claimed to have the advantage of running the discs in opposite directions so that they offset the tractive effect of each other, thereby making it possible to apply a heavy load to the discs and giving them great cutting capacity. There are two pairs of gears used on this floor surfacer, and they are located high up from the floor out of reach of dust and are further protected by cast iron guards that completely encase them. Universal joints are placed between the discs and the upright shafts that drive them. These joints form a double hinge which is said to automatically apply the pressure evenly over the entire discs and permits them to adjust themselves to any irregularities of the floor. Flexible guards form tight casings around the joints.

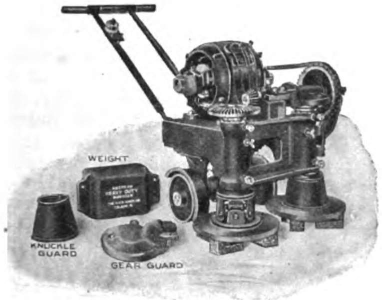


Fig. 1—American Heavy Duty Floor Surfacer

A new type of cut-off table has been brought out by the Crescent Machine Company, 206 Main Street, Leetonia, Ohio. Although the machine is primarily designed for cutting-off purposes, it can also be used efficiently for ripping, grooving and dado work. The part of the table shown on the left side of the saw, Fig. 3 is 22 x 30 in. in size. The table on the right hand side of the saw is 8 x 30 in. and is held in place by two screws; this part of the table will slide sideways for changing saws, and to admit dado heads. The swinging arm is hinged on heavy trunnions fastened to the frame and is counterbalanced with a spring so that it will come forward easily with a touch and swing back quickly when the cut is made. It can be set for full stroke or short stroke of any length or locked in stationary position for ripping or grooving.

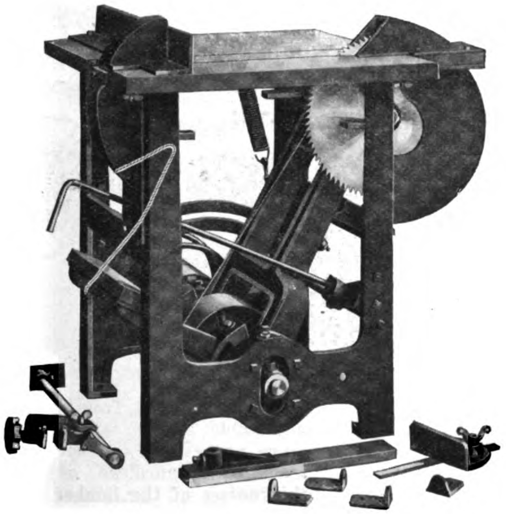


Fig. 3—Crescent Table Cut-off Saw

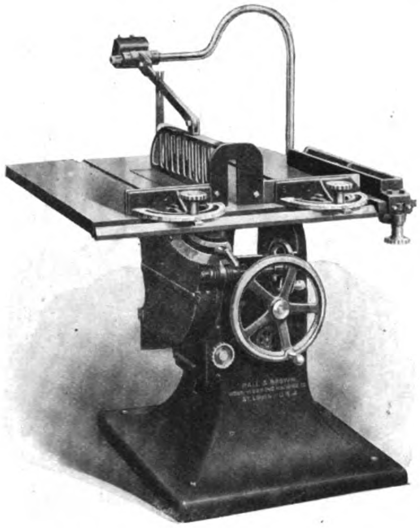


Fig. 4—No. 131 Variety Saw

A concrete mixer especially adapted for small jobs or for detail work on big jobs is shown in Fig. 2. It is called the Wonder Junior Concrete Mixer, and is manufactured by the Waterloo Cement Machinery Company, Toledo, Ohio. It is said to be handy and easily portable. This mixer is charged from the material pile on one side and discharged direct into barrows or forms on the other side. Mortar as well as concrete can be mixed with this machine. There is ample clearance under the steel blades so that the drum can be easily cleaned. Instantaneous discharge of the entire batch is possible. The machine is well built throughout.

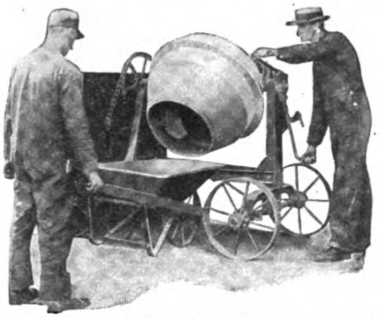


Fig. 2—Wonder Portable Concrete Mixer

An easily portable gasoline builders' hoist is a machine which the builder can put to profitable use in these days of labor scarcity. The Waterloo Cement Machinery Corporation, Waterloo, Iowa, has developed a new model of builders' hoist called the Wonder Builders' Hoist. It is said to be especially adaptable to the operation of single and double cage elevators, has facility in speed and load capacities, and has a one lever control of reversing operations in both directions. The hoist is equipped with builders sheave and also a winch-head. The hoisting drum and elevator sheave are independent of each other. Two expanding band friction clutches enable the operator to run either the hoist drum or the elevator sheave in either direction at will, and makes possible the three following operations: Drum alone may be revolved in either direction with sheave stationary, sheave alone may be revolved in either direction with drum stationary,

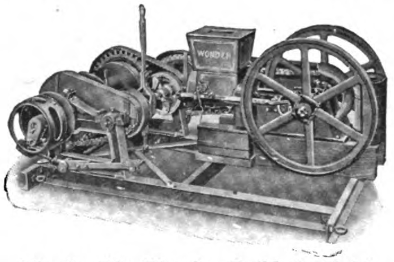


Fig. 5—The Wonder Builder's Hoist

both drum and sheave may be operated together in either direction. The winchhead runs independent of drum or sheave. These hoists, which are shown in Fig. 5, are built on the duplicate part system, which permits complete interchangeability for quick repair part purposes.

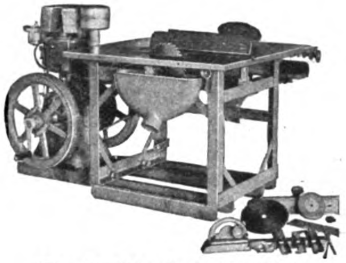


Fig. 6—The I. B. Saw Rig

A new model No. 131 variety saw has been brought out by the Hall & Brown Woodworking Machine Company, St. Louis, Mo. The general appearance of this machine is shown in Fig. 5. It is a medium sized, heavy, substantial machine, embracing some important new features. The table is of iron, and measures 39 x 40. It may be adjusted to any angle up to 45 degrees, the adjustment being made by a segment operated by a worm drive. Two dovetailed grooves are provided for miter crosscut gauges, which are adjusted clear across the table. An opening in the table, 5 in. wide x 18 in. long, allows grooving heads to be used when desired. For regular ripping or cross-cutting, this opening is filled with a wooden plate. The regular equipment consists of one rip-saw gauge and two miter cross-cut gauges, one 14-in. rip and one 14-in. cross-cut saw and a full set of wrenches.

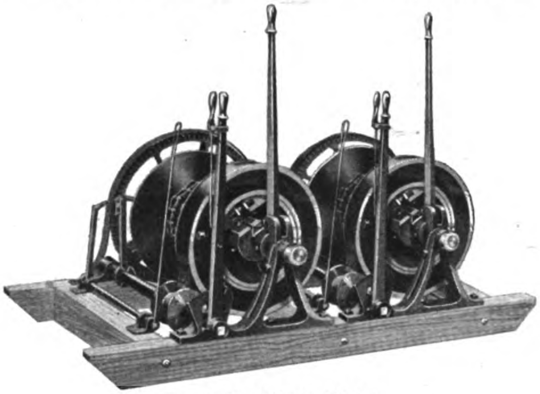


Fig. 7—A Builder's Hoist

A saw rig equipped with a band saw is shown in Fig. 8. It is termed the Eveready Saw Rig and is manufactured by the Oshkosh Manufacturing Co., Oshkosh, Wis. The addition of the band saw is a new feature which has been brought out recently and which is stated to double the usefulness of the Eveready in many cases. The band wheels are 24 in. in diameter. The main frame is all cast semi-steel, with heavy ribbing to give most strength with as little weight as possible. The table is also of cast semi-steel and may be used for cutting bevels up to 45 deg. The saw rig is equipped with the regular attachments and a hollow chisel mortiser. The band saw feature of this new model may be attached to any of the older Evereadys by merely boring four bolt holes.

A type of hoist which is built in both single and double drum types set up on timbers 4 x 6 x 84 in. long, with skid 42 in. wide, is shown in Fig. 7, the double drum type being shown. It is of a type manufactured by the Brown Clutch Company, Sandusky, Ohio. The spool of the drum is 6 in. in diameter and 17¾ in. between the flanges, and carries about 1500 ft. of ⅜ in. wire cable. The drum is loose upon the shaft and carrier or hooks can be returned to the hoist without effort upon the part of the operator. The flanges are 24 in. in diameter. The floor space over all less the skid is 36 x 50 in. This hoist has a guaranteed capacity of 2500 lb. The regular equipment furnished for this hoist consists of a winch head, 10 ft. of chain and 36-tooth sprocket upon the hoist and 6-tooth sprocket for the engine shaft. The chain has a working strength of 2500 lb., although heavier chain and sprockets can be supplied extra if desired.

A small saw rig especially adapted to meet the requirements of the small builder has recently been brought out by the Whitman Agricultural Company, St. Louis, Mo. It is termed the I. B. Sultan Saw Rig and is shown in Fig. 6. It is 33 in. high from the floor to the table top and is constructed of iron and steel. The rated horsepower is 3½ hp. A gravity blower is provided with each saw rig, ample provision being made to carry away all sawdust from the saw. Nonadjustable safety saw guards that require no setting and which work automatically regardless of the varying thicknesses of the lumber used are also provided. The sanding wheels have a safety lapping device and means for quick adjustment in renewing the surface of the wheel. The saws used are all of Disston manufacture.

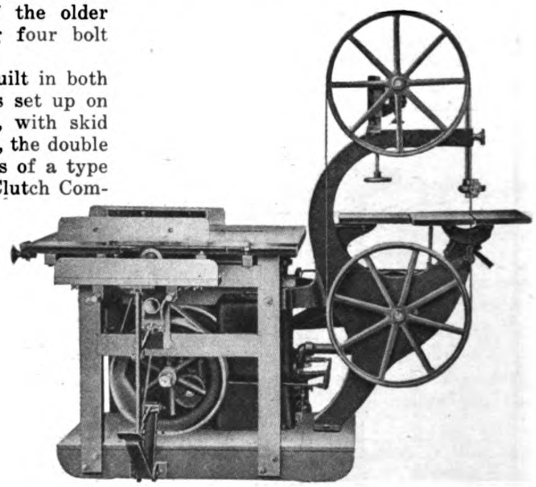


Fig. 8—Eveready Saw Rig

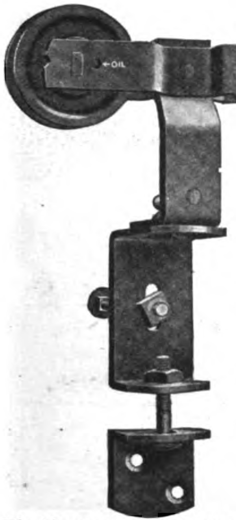
New Catalogs of Interest to the Trade

Any of these catalogs will be furnished by the manufacturers. Or, if you prefer, we will see that you receive any that you desire. Just check the catalogs you want, tear out the page, and mail it to Building Age, 243 West 39th Street, New York.

Wood Bottom and Iron Planes.—Published by Sargent & Company, 53 Water Street, New Haven, Conn. Contains a description of various types of planes. Describes and illustrates the planes manufactured by this company.

The Best in Facing Bricks.—Published by the Beaver Clay Manufacturing Company, New Galilee, Pa. Contains colored plates showing the colors in which this company manufactures bricks. Special shapes are also shown. Several brick mantels and fireplaces are shown in colors. Miscellaneous information concerning various styles of bonds in brickwork, sizes of mortar joints, etc., is also contained.

The Beck Vertical Files.—Published by Eugene Dietzgen Company, Chicago, Ill. Contains information concerning files for filing drawings, tracings, blue prints and sketches. A variety of files are illustrated and described.



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The rewards will come to the man who masses his attack.

NATIONAL GARAGE DOOR SETS

mean more profit to you—

PREPARE FOR SPRING BUSINESS.

Look up the new car owners in your neighborhood and show them this new set.

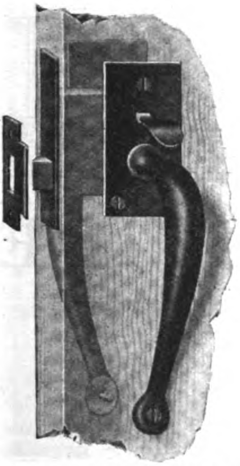
THE NATIONAL is absolutely the easiest working garage door set, as there is no binding or friction. They are guaranteed to work freely.

Doors hung with these sets require but a minimum of space in opening, as they are hung in the inside and fold and slide against inner wall.

It is the cheapest and most substantial set you can offer your customer.

One Door Opens Without Disturbing the Others.

THE PRICE is within everybody's reach and there is a liberal profit in them for you, Mr. Builder.



The No. 27 Latch has no complicated parts to get out of order

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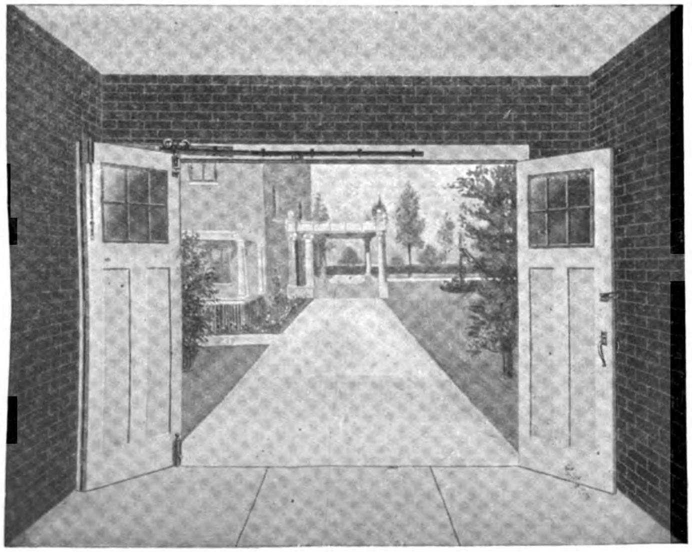

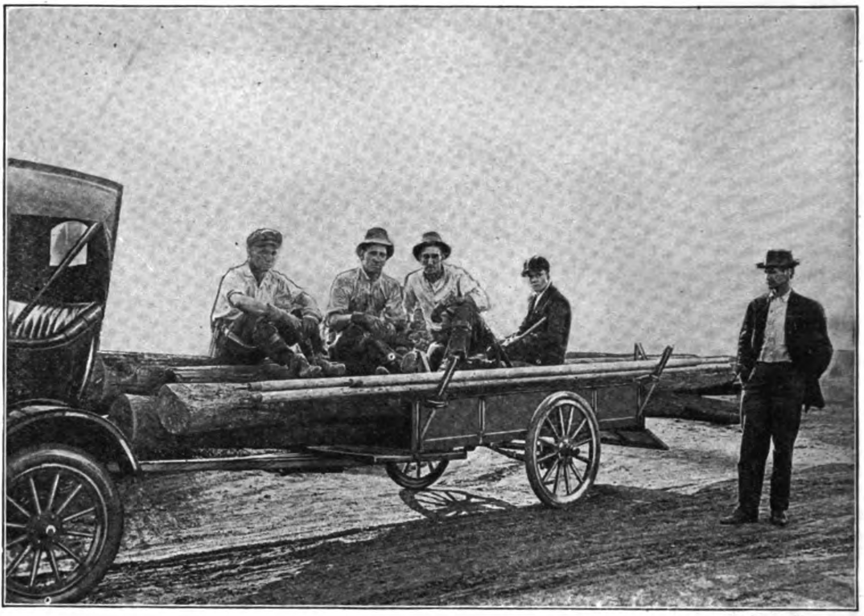

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THE ROGERS LUMBER TRAILER FILLS A LONG FELT WANT

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Capacity, 2000 lbs., and will stand up indefinitely under all strains.
The strongest and most durable trailer ever built.
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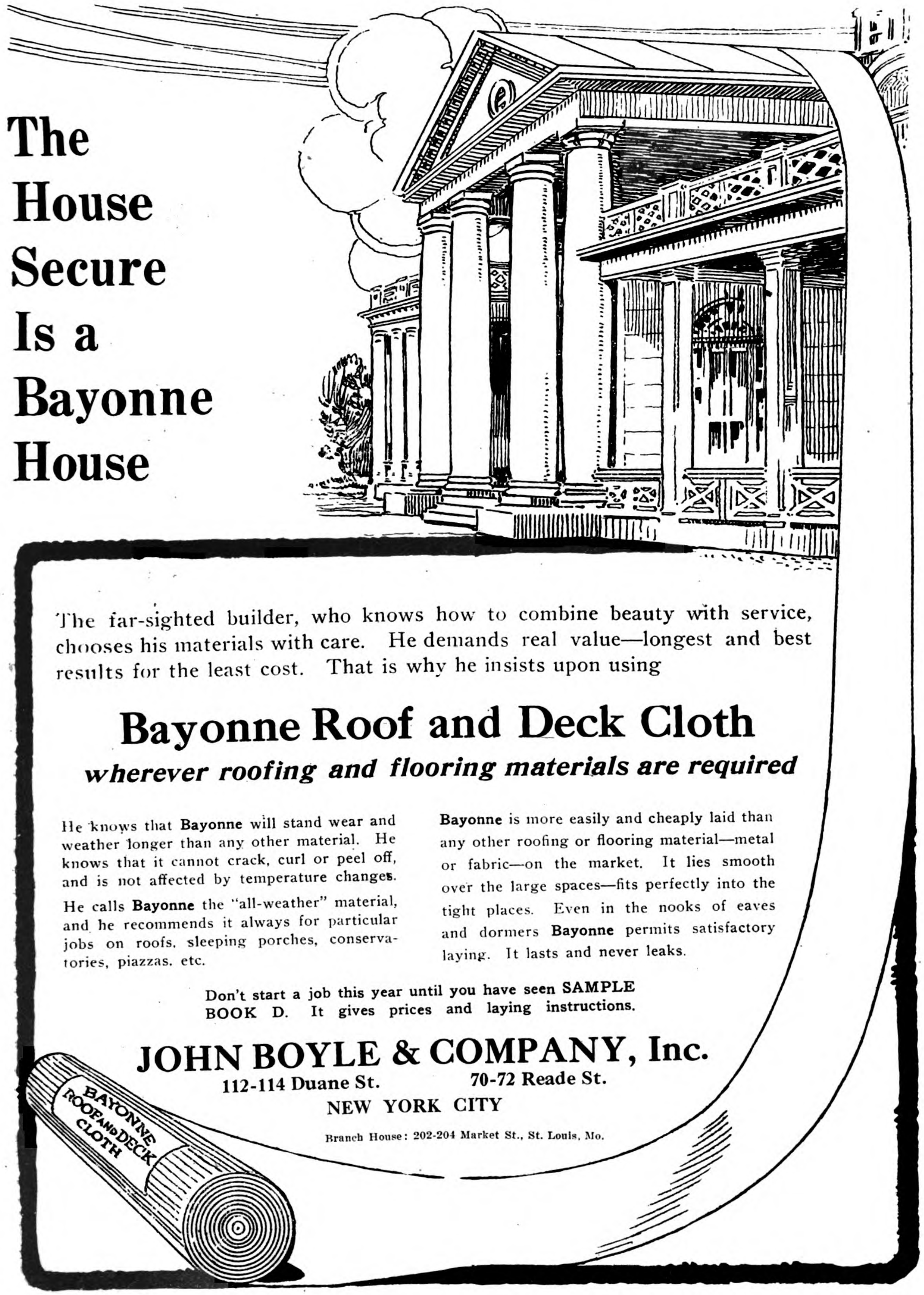

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The far-sighted builder, who knows how to combine beauty with service, chooses his materials with care. He demands real value—longest and best results for the least cost. That is why he insists upon using

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wherever roofing and flooring materials are required

He knows that **Bayonne** will stand wear and weather longer than any other material. He knows that it cannot crack, curl or peel off, and is not affected by temperature changes.

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which extracts and retains all the heat (that usually goes up the chimney from other heaters) and forces this heated air through the house, leaving only sufficient heat in the smoke and gas to create a good draft.

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NOTE THE DIRECTION OF COLD AND WARM AIR. Notice the long fire travel, the simplicity of construction, etc. The FORBES is *only 4 feet 3 inches high,* a feature to be considered when installing furnaces in low cellars. The entire radiating surface of the fire-pot, dome, smoke neck and manifold is greater than that of any other heater on the market.

Send a Rough Sketch of Building

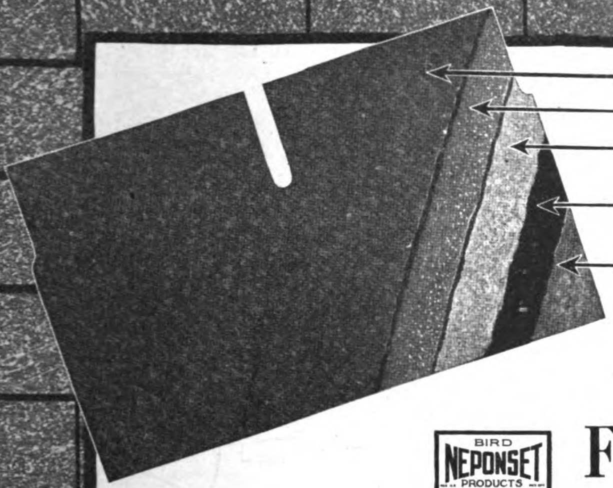
and we will outline a heating system to meet your requirements and estimate on costs.

Our catalogue will convince you of the superior merit of the FORBES WARM AIR GENERATOR.

Let us figure on your next installation.

TUBULAR HEATING & VENTILATING CO.

232 Quarry Street, Philadelphia, Pa.



This illustration shows why Neponset Twin Shingles are called "the roofing development of the twentieth century." First, there is a heavy sheet of tough, fibrous felt (made in our own mills). Second, this felt is thoroughly soaked with everlasting asphalt. Third, a layer of crushed stone is deeply imbedded in this sheet under enormous pressure. Fourth, another layer of Neponset Compound is applied over the crushed stone. Fifth, a layer of crushed slate gives the Neponset Twin Shingle its attractive surface of red or green.

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Five Layers—Six Processes

Note the illustration carefully. It tells a real quality story. Read the descriptive text. It shows *why* there are years and years of life and usefulness ahead of a Neponset Twin Shingle Roof.

Here are other advantages for *you*. Your man works *faster* with Neponset Twin Shingles. He handles only half the quantity that he would of single shingles. He works straight ahead because the notches automatically take care of spacing.

NEPONSET
TWIN
SHINGLES

mean a speedy job, and a good job with less material—180 20-inch Neponset Twin Shingles, laid 4 inches to weather, cover 100 sq. feet. It takes 424 single shingles to cover the same surface. It takes 848 nails for covering this area with single shingles and only 540 nails with Neponset.

If need be, one man can lay a roof with Neponset, because they're light and easily handled. It's really handling two shingles in one—the Only Twin Shingle —unbeatable for appearance, quality, and true economy. Write to-day for full information about Neponset Twin Shingles.

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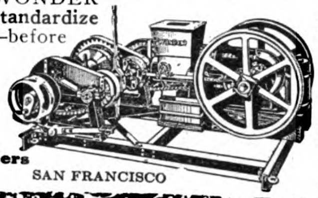
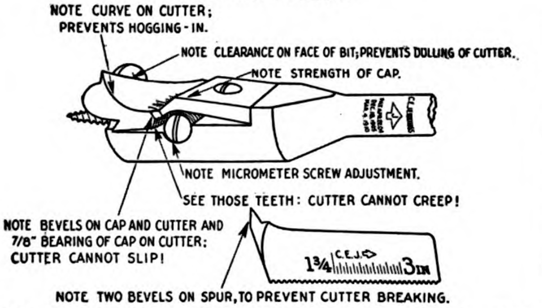
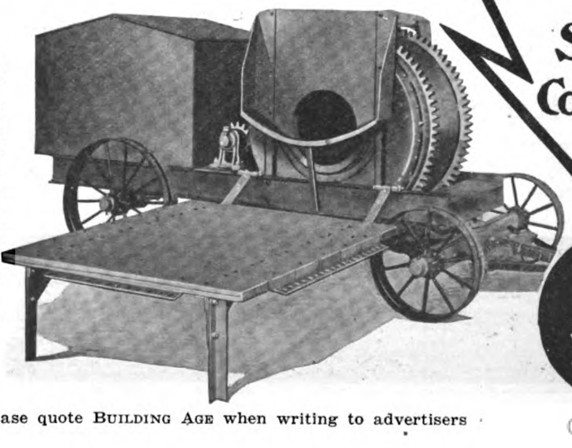
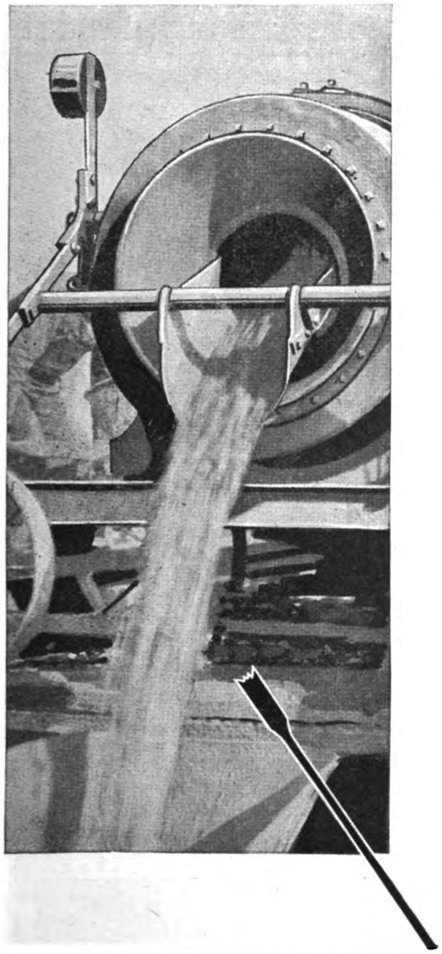



NOTE CURVE ON CUTTER; PREVENTS HOGGING-IN.
NOTE CLEARANCE ON FACE OF BIT; PREVENTS DULLING OF CUTTER.
NOTE STRENGTH OF CAP.
NOTE MICROMETER SCREW ADJUSTMENT.
SEE THOSE TEETH: CUTTER CANNOT CREEP!
NOTE BEVELS ON CAP AND CUTTER AND 7/8" BEARING OF CAP ON CUTTER; CUTTER CANNOT SLIP!
1¾ C.E.J. 3 IN
NOTE TWO BEVELS ON SPUR, TO PREVENT CUTTER BREAKING.



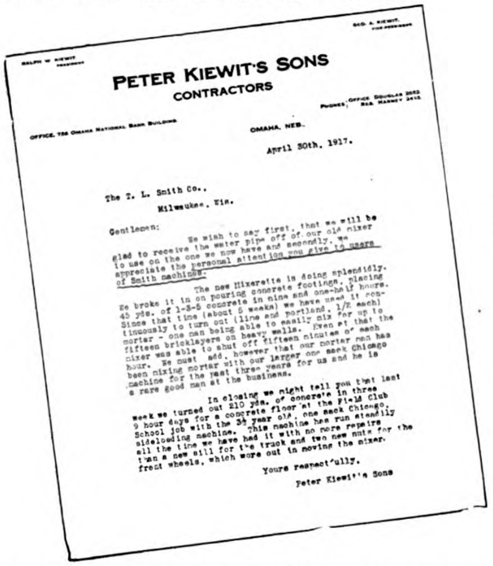


What Peter Kiewit's Sons Told Zack and Also Us

First, Zack had no interest in the Smith Mixerette except as it represented a news item for his paper.

Zack states that Peter Kiewit's Sons told him that they poured 45 cu. yd. in 9½ hours for the first day's run—that they had other and larger Smith-Chicago mixers but due to the labor situation it was more economical to use the Smith Mixerette on this class of work—the work referred to being a $67,000.00 school building in Omaha, Neb.

So much for Zack. Here is what they wrote us:



PETER KIEWIT'S SONS
CONTRACTORS

OFFICE, 756 OMAHA NATIONAL BANK BUILDING
OMAHA, NEB.

April 30th, 1917.

The T. L. Smith Co.,
Milwaukee, Wis.

Gentlemen:

We wish to say first, that we will be glad to receive the water pipe off of our old mixer to use on the one we now have and secondly, we appreciate the personal attention you give to users of Smith machines.

The new Mixerette is doing splendidly. We broke it in on pouring concrete footings, placing 45 yds. of 1-3-5 concrete in nine and one-half hours. Since that time (about 5 weeks) we have used it continuously to turn out (lime and portland, 1/2 each) mortar - one man being able to easily mix for up to fifteen bricklayers on heavy walls. Even at that the mixer was able to shut off fifteen minutes of each hour. We must add, however that our mortar man has been mixing mortar with our larger one sack Chicago machine for the past three years for us and he is a rare good man at the business.

In closing we might tell you that last week we turned out 210 yds. of concrete in three 9 hour days for a concrete floor at the Field Club School job with the 3½ year old, one sack Chicago, sideloading machine. This machine has run steadily all the time we have had it with no more repairs than a new sill for the truck and two new nuts for the front wheels, which wore out in moving the mixer.

Yours respectfully,
Peter Kiewit's Sons

What is the answer? Just this: A Smith Mixerette will make money for **you** on **your** work. Fill out the coupon below and send for our big NEW catalog describing the Smith Mixerette and the other Smith Chicago Mixers.

SMITH MIXERETTE

Send for the NEW CATALOG

Without any obligation on my part, mail me a copy of your NEW Catalog No. 115-F, showing the Smith Mixerette.

Name ....
Address ....
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The T. L. SMITH CO.
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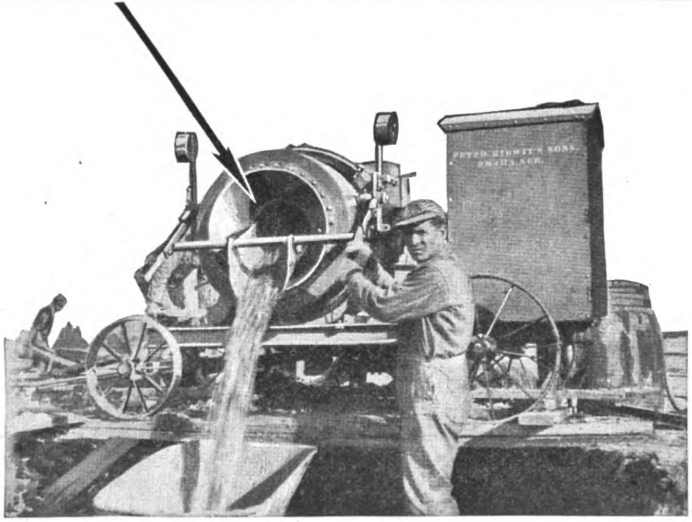
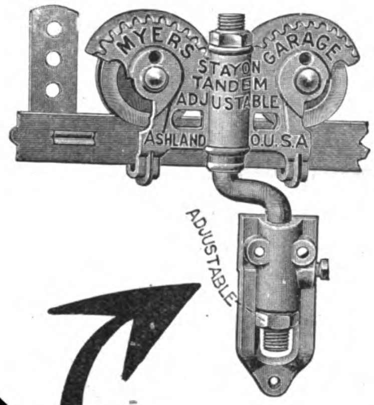


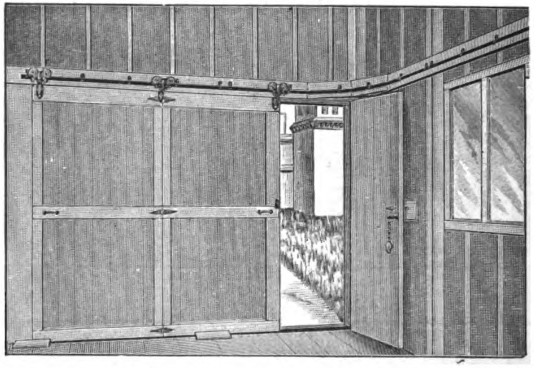


It Slides Around the Corner

And will not come off the track—

NOTE THE ADJUSTABLE FEATURES

MYERS
RIGHT ANGLE GARAGE DOOR
HANGER



Why build garages with swinging doors—they are a continual annoyance and take up too much space.

The MYERS RIGHT ANGLE GARAGE DOOR HANGER and TRACK are placed inside and—the doors roll around the curve at the corner and are out of the weather—out of the way. You have uniform door service from season to season throughout all kinds of weather without sweeping snow, chopping ice, or fastening doors every time you open or close them—there is no chance of damage through bumping into a free swinging door.

Note another big convenience—the separate foot door. It eliminates the necessity of opening or closing the sliding doors every time you enter or leave the garage.

Doors hung with Myers Garage Hangers operate satisfactorily in sets of two, three or four—any flat 1¼ in. steel track will answer for them. It is not necessary to buy a curved section of track for the corner—you can bend a piece of the regular straight track for this.

Double Stayon Device, Vertical and Lateral Adjustments, Steel Roller Bearings, Tandem Rollers, Heavy Malleable Iron Frame, and many other important improvements insure superior door service not only for garage doors but for sliding doors on barns, sheds, warehouses and similar buildings where space is limited or where uniform year through door service is desired.

Catalog gives full description. Our Service Department will be glad to mail you a copy and send particulars and price. Write today.

F. E. MYERS & BRO., Ashland, Ohio
ASHLAND PUMP AND HAY-TOOL WORKS

BUILDING AGE

New York, March, 1918

A Stucco Coated House with an Interesting Floor Plan

ONE of the most interesting things about the residence of Mr. O. H. Hanson is the arrangement of the hall and stairs. A vestibule, which is a feature considered essential by many in northern climates, shuts off the hall from the entrance. The hall itself is primarily a connecting link between the living room, dining room and stairs. Being treated as such, it gives an unusual sense of spaciousness as one enters the house, for this extra space is practically incorporated with the adjoining rooms, and especially the living room.

The stairs, as shown in one of the accompanying illustrations, are practically in a recess of the living room, the peculiar arrangement illustrated being possible by the excellent planning of the hall in connection with the living room.

The service portion of the house is kept well away from the living portion, as a glance at the accompanying floor plan will show. An entrance to the right of the stairs leads directly into the pantry, through which communication is established with the kitchen. The pantry can also be entered directly from the dining room. This arrangement means that there are two doors between either the hall or dining room and the kitchen, so that odors from cooking will not readily be carried to the other part of the house. The entire arrangement of this first floor is well worth studying.

The accompanying drawings, which are direct reproductions from the architect's working drawings, show the various details of plan and design, so that comment thereon is unnecessary.

According to the specifications of the architect, the footings were composed of large stones 4 in. wider each side than the foundation wall, and 8 in. thick. These were thoroughly cemented together.

The foundation walls are of stone, laid in cement mortar. The walls above grade were built of selected fieldstone. The joints of the exposed walls above grade and those of the chimneys were raked out and pointed with tinted cement mortar. The outside walls from the footing course to the grade line had the joints pointed and the wall was then given a thick coat of hot tar, which acts as a waterproofing.

The joints of the walls exposed in the cellar were thoroughly pointed with cement mortar. The cellar floor was constructed of a 1:2:5 concrete mix laid 3 in. thick, and received a 1-in. top dressing. The sills are of bluestone 4 in. thick and extend 2 in. into the walls each side.

The walls were well pointed up around door and window frames so as to make all parts tight. The chimney was constructed of hard burned common red brick. Above the roof it was built of selected fieldstone. The flues were lined with terra cotta, a 13 x 13-in. flue being used for the fireplace, a 9 x 13 for the boiler and a 9 x 9 for the kitchen range, the latter flue being run through to the basement with a connection for a laundry stove. The range and furnace flues were provided with clean-out doors.

The framing timbers were of spruce, the sizes of the principal members being as follows:

First floor joists 2 x 10 in., second floor joists 2 x 8 in., attic joists 2 x 6 in., all placed 16 in. on centers. The rafters are 2 x 6 in. placed 24 in. on centers. The studs are 2 x 4 in. placed 16 in. on centers. The floor joists for the front and rear porches are 2 x 6 in. and placed

The Stairway, as It Appears from the Living Room

A Large Fireplace Is One of the Features of the Living Room

24 in. on centers. The sill is 4 x 6 in. in dimension and was well bedded in cement. The girder in the basement is built up of three 2 x 10-in. joists, well spiked together.

The first tier joists were leveled and let into the sill. Floor joists were doubled under all partitions running the same way. All headers and trimmers were doubled. The floor joists butting against the girders were supported on 2 x 4-in. pieces spiked to each side of the girder. The second floor joists are carried upon 2 x 4-in. plates, well spiked to the studs.

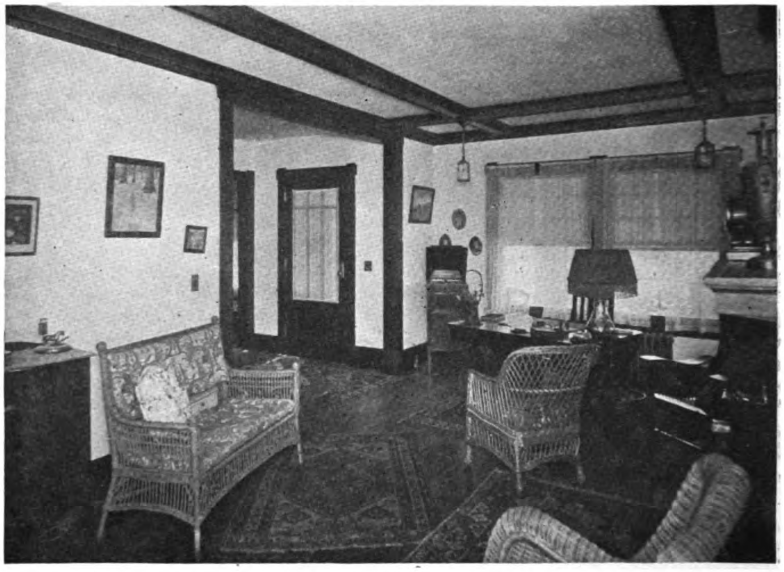
Partitions were built of 2 x 4-in. studs set 16 in. on centers. The plates of the openings consist of doubled studs. The floorbeams were cross-bridged with 1 x 3-in. stuff. The roof was covered with ⅞ x 2-in. hemlock boards, spaced 5 in. on centers. Over these were applied 18-in. red cedar shingles laid 5 in. to the weather, and given one brush coat of Cabot's stain after laying. The ridge of the main roof is built up of shingles.

The walls were sheathed with ⅞ x 9-in. tongued and grooved shiplap yellow pine. Over this was placed Neponset building paper, well lapped and run around all cracks and openings at windows, doors, cornices, etc., so as to render them air-tight. Wood lath spaced 9 in. on centers was placed over this. To this was applied Roebling 24-gauge galvanized metal lath, lapped at least 1½ in. and nailed with staples. Over this was applied three coats of cement stucco.

The outside trim is of cypress, painted three coats at completion.

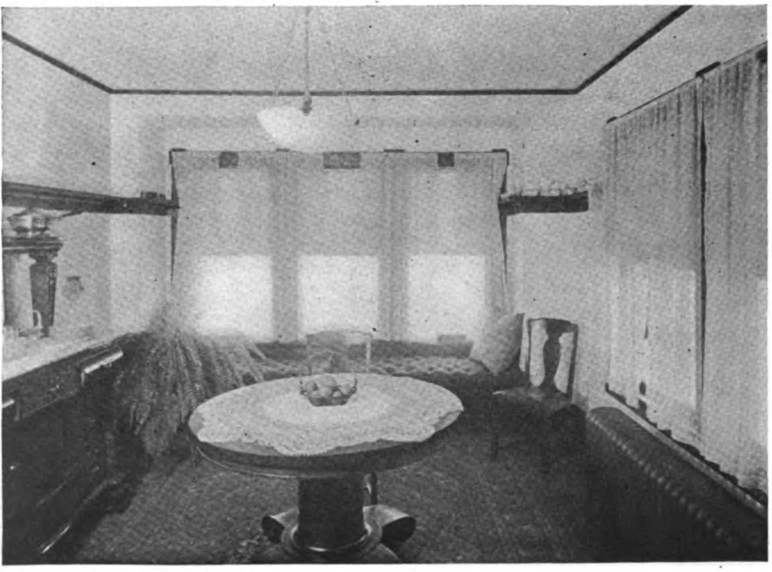
The floors of the front and rear porches are of tongued and grooved Oregon fir. They are ceiled with ⅞-in. x 2½-in. tongued and grooved double-

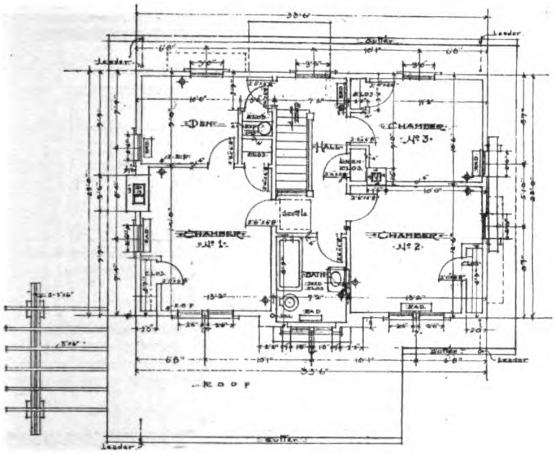
The Rear Elevation is Interesting



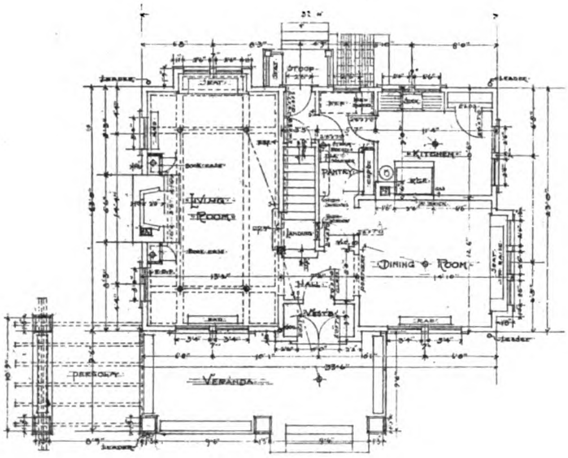
The Living Room, Looking Toward the Front Door

Below is a View of the Dining Room

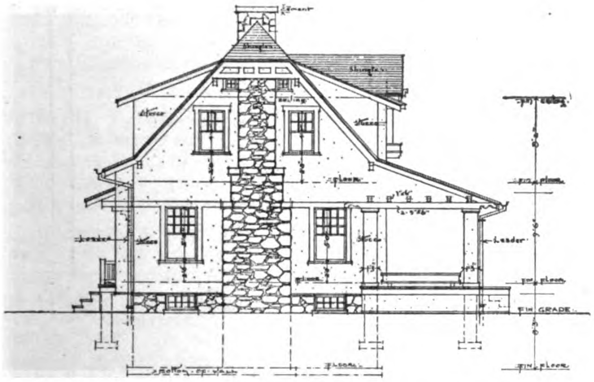




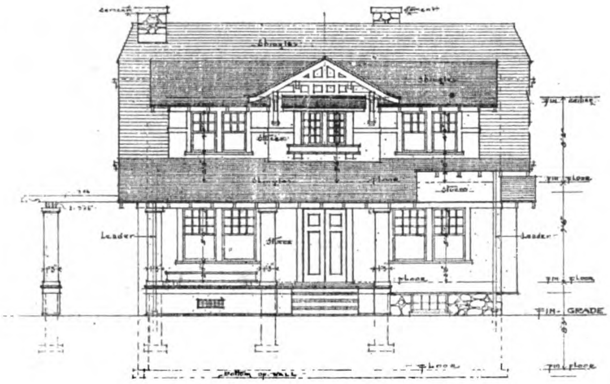
Second Floor Plan, Scale 1/16" = 1 ft.



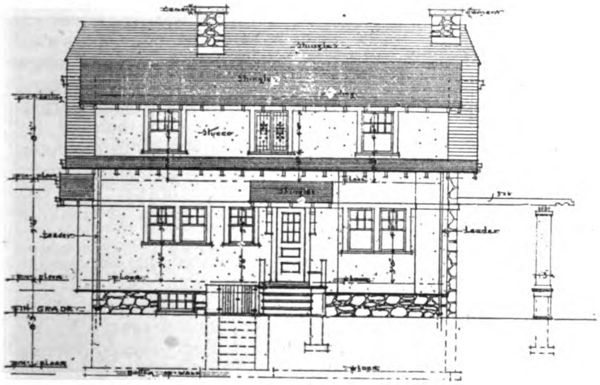
First Floor Plan, Scale 1/16" = 1 ft.



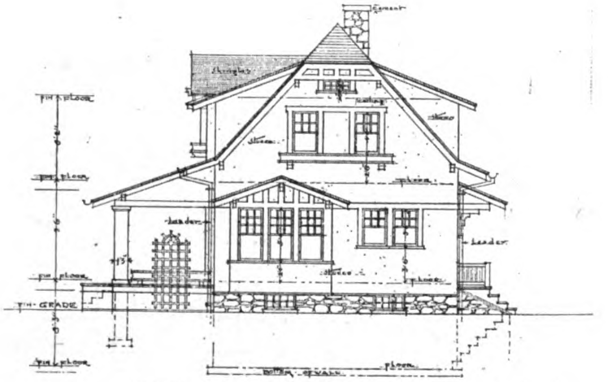
Left Side Elevation, Scale 1/16" = 1 ft.



Front Elevation, Scale 1/16" = 1 ft.



Rear Elevation, Scale 1/16" = 1 ft.



Right Side Elevation, Scale 1/16" = 1 ft.

beaded North Carolina pine ceiling boards.

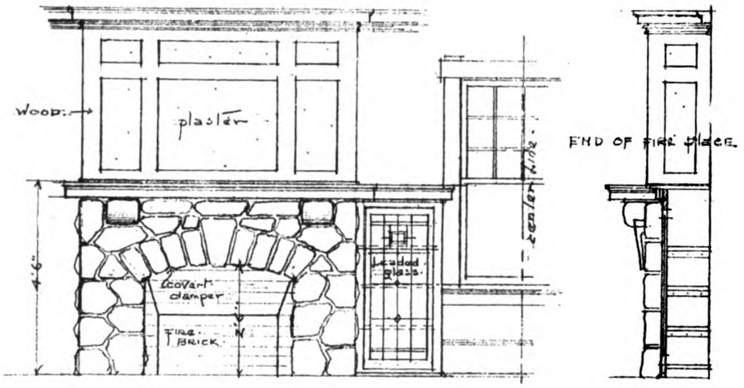
The brackets at the end of the gables are of 3 x 8-in. stuff, well anchored into the building.

Where the living room and dining room bays project over the foundation, the cold was kept out in the following manner: Planking ⅞ in. thick was cut in between the floor joists 3 in. from the top. Over this was placed cinder concrete up to the top of the joists.

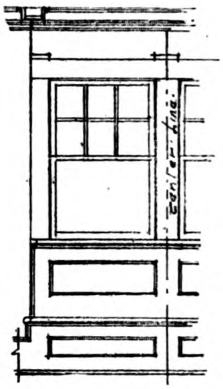
The vestibule is floored with 1-in. white hexagonal tile laid in cement. The front entrance door is of oak.

The main stairs are provided with a bottom newel 8 in. square with molded cap and base. The rail is 2½ x 3 in., treads are 1⅛ in. thick, rises are ⅞ in. thick and provided with a ⅞-in. cove molding under the nosing of the treads.

Floors throughout the house are double. The sub-floor is composed of ⅞ x 8 in. hemlock tongued and grooved surface boards. The finish floor on the first story is of ⅞ x 2½-in. oak, which at completion was given one coat of paste filler and two coats of Supremis. The finish floors in the kitchen and second story are ⅞ x 2½-in. edge grain tongued and grooved Alabama pine, which at completion were given two coats o

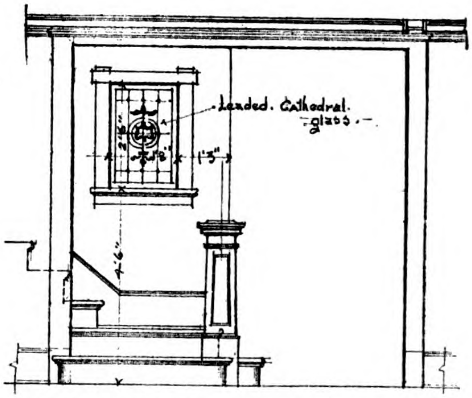


At the Left is the Elevation and Section of Fireplace, Bookcase and Window in Living Room. Scale ¼" = 1 ft.

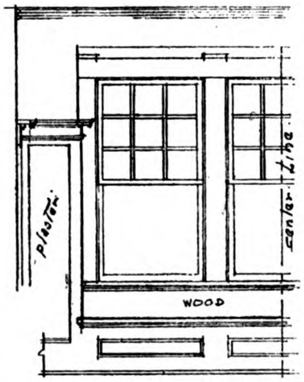


At the Right Is Beam Ceiling, Windows, Trim, Seat, and Bay in Living Room. Scale ¼" = 1 ft.

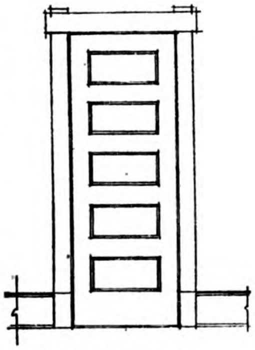
Elevation and Section of Cupboards in Pantry, Scale ¼" = 1 ft.



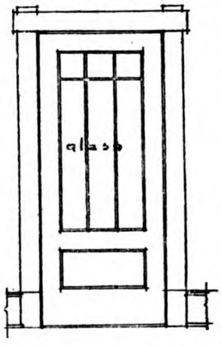
Front of Main Stairs from Living Room, Scale ¼" = 1 ft.



Windows and Trim in Dining Room Bay. Seat, Plate Shelf and Strips for Plaster Panels Originally Proposed. Scale ¼" = 1 ft.



Typical Interior Door and Trim, Sizes Shown on Plans



Front Vestibule Door

Supremis. A ¾-in. round molding forms the finish between the walls and floor.

Trim on the first floor is of chestnut, which was given one coat of stain, one coat of shellac and one coat of deadlac. Trim in the second story is of fir, which was given three coats of paint and two coats of eggshell enamel. Doors on the first floor are of chestnut and on the second floor are of birch. Trim and doors in the pantry and kitchen are of cypress.

The ceiling in the living room has 3 x 7-in. built-up beams. At the junction of the walls and ceiling 3 x 3-in. beams were placed to form an attractive finish at this point.

The interior walls were given three coats of plaster, which was applied over spruce lath spaced not more than three-eighths of an inch apart. The joints of the lath were broken every tenth course. Steel corner beads were used on all exposed angles. Metal lath was used at the intersection of brick and stud walls. On each side of the living room fireplaces bookcases were built in, these being glazed with leaded glass. A built-in seat is placed in the bay window.

The dining room is provided with a plate shelf. The kitchen and pantry are provided with built-in dressers and cupboards. The hearth is composed of cement, which was laid over a 3-in. concrete fill. A gas water heater and a Richardson & Boynton range were provided.

Metal lath was applied to the walls of the bath room to a height of 4 ft. 6 in. Over this was placed cement, which was well scratched to receive 3 x 6-in. white semi-glazed tile. The junction of wall and floor was finished with a cove molding so as to form a neat finish. The top of the tile wainscot was finished with a wood cap.

A vacuum cleaner constitutes one of the features of the house.

The house is provided with hot water heating apparatus. The roof drainage is taken care of by 5-in. heavy galvanized iron gutters, hung with Berger hangers, spaced not more than 30 in. apart. The leaders are 3 in. in diameter and are of corrugated galvanized iron. Flashing is of Argo brand, I.C. tin, which was given two coats of metallic paint on each side.

This house is located in Larchmont Gardens, New York, and was built for Mr. O. H. Hanson in accordance with plans and specifications prepared by W. S. Moore, 30 East Forty-second Street, New York City. The contracting builder was John New, 26 Union Street, New Rochelle, N. Y.

A HOLLOW TILE CHURCH FOR THE SUBURBS

In the description of "A Hollow Tile Church for the Suburbs," contained in the January issue, the roofing material was erroneously specified. Flexatile Diamond Pointed slab shingles, manufactured by the Heppes-Nelson Roofing Co., Dept. A, 1011 Kilbourne Avenue, Chicago, Ill., was the material used.

Fig. 1—Elevation of the House Before Remodeling

How a Two-Story House Was Remodeled Into a Three-Story

A Practical Outline of the Manner in Which the Work Was Done

By Owen B. Maginnis

IN Fig. 1 readers will observe the elevation of an old but sound two-story frame house which it was necessary to enlarge in some way in order to gain more chamber accommodation.

Of course, the ordinary and simplest way to do this would have been to build on an "ell" extension or addition, either on the ends or rear. Unfortunately, there was not sufficient available room on the two 25x50-ft. lots on which the building was situated to extend it on the ground level. So, after much discussion, it was decided by the architect that the only possible way to get the rooms was either to lift the house from below and build a basement story under it or to raise up the roof and insert a third story on top of the existing second story.

The latter plan having been adopted, orders were given to go ahead and the job was proceeded with, as follows:

The construction of the old roof and its condition were first carefully studied over to ascertain if it were in a fit state to withstand the strain of the raising. Its design being of old form, it was strengthened by nailing on reinforcing braces and struts, as shown by Fig. 3. This being well and thoroughly done, the whole house was sawn through the outside walls just below the cornice on the line A B in Fig. 1 and C D in Fig. 3. Iron and oak wedges were driven in the saw kerfs of every 2x4 wall stud and all the corner and intermediate posts to keep the hand saw's kerfs open, as the roof's weight might bind them.

In the meanwhile, the entire interior rooms had been shored up from the cellar from floors to ceilings on each story and longitudinal or fore and aft 4x6-in. timbers laid on top of the top plates of the upper partitions and uprights and on these were placed pump screws, one at each end as indicated in Fig. 2. Also the chimney and projecting caps were cut off to the face lines of the brickwork. One man, a carpenter, was placed at each screw and on the signal of a whistle from the foreman, each mechanic turned a half turn, quickly and gently lifting the roof from its position. As the saw cut gradually widened and opened, oak wedges and blocks were driven or set in on every second stud and on corners to secure the full bearing and guard against any possibility of sagging or slipping. Also the spirit level was constantly applied and watched in order to keep the whole fabric in perfect equilibrium, for it must be remembered that the underlying structure was of the semi-balloon type of framing so that the utmost caution and vigilance had to be used in proceeding with this rather unusual and difficult operation.

This is the description of an unusual job of remodeling. It is a thoroughly practical outline of the manner in which the work was done, as told by one of those in charge of the operation.

Other readers of "Building Age" undoubtedly have also shared in remodeling jobs, and we will gladly pay for any practical articles telling how such work was done.

Having been slowly and gradually raised up to the required height to gain the desired story, temporary, strong 2x4-in. diagonal braces were nailed on from the new third story tier of 2x8-in. floor beams, as shown by the dotted lines, which were slid in when space permitted, resting on and being well spiked to the original wall plates of the second story. Also a temporary floor for scaffolding was set on these beams for the men to work on. In a similar way, the raised roof was diagonally braced longitudinally, the braces being nailed to the new corner posts and wall studding on the inside so as not to interfere with the placing of the outside sheathing. This was of tongued and grooved planed boards, also later nailed on diagonally for extra strength.

All the work of the new story was mostly done from the new third story floor with the exception of the sheathing, clapboarding and outside trim and patching, which the carpenters did from outside portable bracket scaffolds.

This alteration, although of great risk and an experiment in the fact that it is rarely done in frame house construction, was a complete success, having been brought to completion without a single

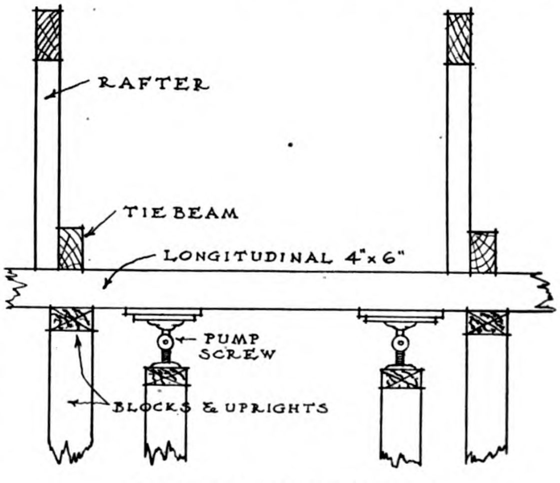


Fig. 2—Detail of Raising Gear

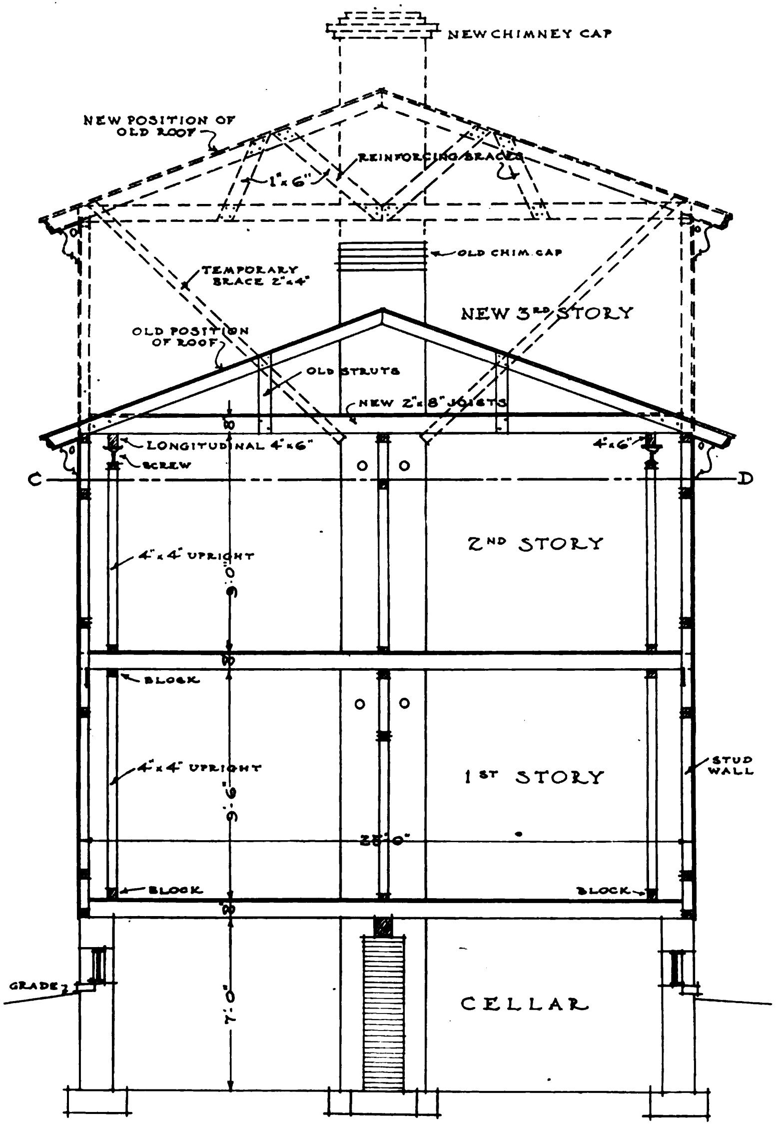


Fig. 3—This Shows How the Extra Story Was Added

accident or a man hurt. But luck and good weather contributed much, as the days were gentle without any heavy rains or storms to threaten or injure the old building or strain it out of plumb or make it unsafe.

How Did Wall Board Originate?

Here Is Some Interesting Information Concerning the History of This Popular Material

By Joseph A. Poesl

WALL BOARD, as we know it to-day, was probably invented by a certain R. G. Adams of Grand Rapids, Mich, in or shortly prior to the year 1884. At any rate, he was granted a patent on built-up panels made by inserting a piece of cloth between an even number, usually two, sheets of wood pulp board and uniting them with adhesive. In his patent brief Adams states that his invention is intended for building and manufacturing purposes. He claims therein that while large wood panels are costly, his panels possess cheapness, stability, and the capacity to hold paint without danger of checking, splitting or warping. Identical claims are now made for wall board.

However, it is quite evident that this inventor did not realize the one great possibility of this product of his ingenuity: the displacement of lath and plaster. The fact that it was named "panel" would seem to convey the impression of exclusive use for panels in wainscoting and furniture panels, instead of wood. It is very unlikely that the feasibility of its ever displacing lath and plaster for walls and ceilings was even considered at that time.

Another wall board of a radically different nature was patented ten years later. It consisted of a core of wood faced on either side with pulp or straw board. In those years, though, it was not designated by the term "wall board"; it found its greatest use, if not only use, for the ceilings of railway coaches. Now it is wall board to both maker and consumer.

Not long after the advent of this wood-and-paper board another wall board came on the market. It was made somewhere in Maine and was a board that closely resembled a most popular wall board of to-day: that which is constructed of pure wood fiber and marketed under three or four great brands. Yet, notwithstanding the fact that at least two other wall boards preceded it, the belief that it was the original is still entertained by a few persons. One thing about it is certain, however, and that is it was the first board whose principal function was the interior finishing of walls. Despite this, "wall board" as a suitable appellation apparently did not occur to the makers, insomuch as it was sold as "panel board." Nothing has been seen or heard of it for years, so it is evidently no longer in existence.

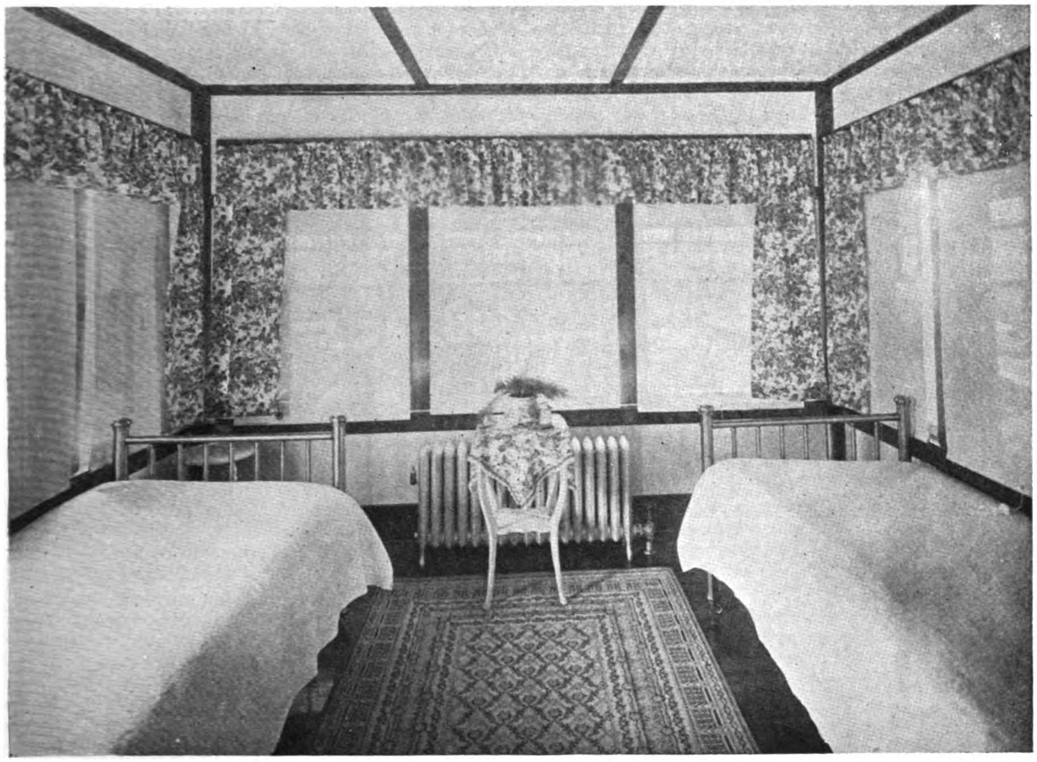
The year of 1906, or thereabouts, brought forth the first pulp board to be called "wall board." Its purpose was to supplant lath and plaster, wood paneling, matched boards and metal ceilings, wherever these wall coverings were employed; this purpose has never been changed. Thereafter wall board after wall board appeared for sale in quick succession until now it would not be difficult to mention nearly thirty different boards offhand.

The term "wall board" in itself may be properly applied to any fabricated composition or other board used as an interior wall covering and is sufficiently substantial to produce a rigid wall. This, of course, excludes wall paper and light cord boards. Neither is the special paper forming the screens or sliding partitions in Japanese houses wall board.

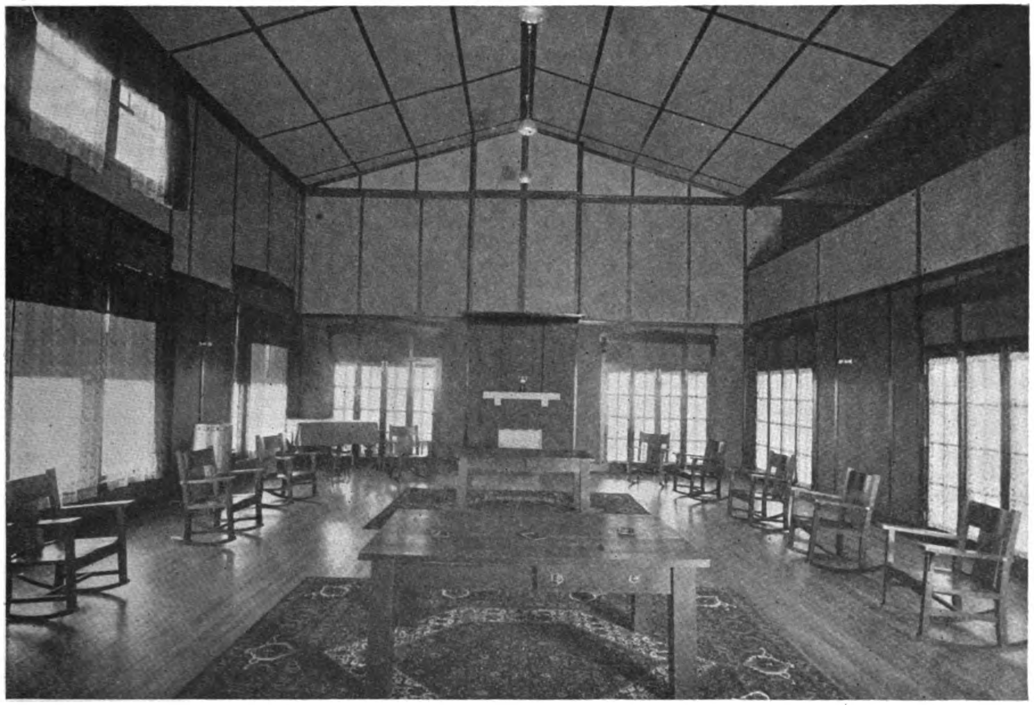
That is why I hardly believe that wall board was utilized by the Japanese as far back as 600 A. D. In my researches I have never been able to discover the use of anything but a heavy paper in Japanese house construction.

We now make a most interesting part of this little history. We are about to decide whether England or America deserves the honor of having originated wall board. From what already has been written, it would appear as if no question could be raised as to our right to it;

but if we include papier-mache in the category of wall boards, as some would have us do, we most surely relinquish all our claims and grant whatever glory there is in it to our brother across the sea.



Wall Board Lends Itself Well to the Treatment of Bed Room Walls and Ceilings



The Large Room as Well as the Small Room Can Be Made Attractive by the Use of Wall Board

That papier-mache has been employed as wall board is hard to gainsay. As far back as a century it was used as such, for we may gather from such reliable source as the Encyclopedia Britannica the knowledge that in 1772 Henry Clay of Birmingham, England, secured a patent for a method of preparing papier-mache in such a manner that it could be used for coach building, for door and other panels, and for many furniture and structural purposes. Moreover, soon after the application of this material to architectural decoration was patented.

Because wall board is now, and has been for some time, used for the ceilings of railway coaches, for door panels, for furniture and structural purposes, the claim that papier-mache in certain forms is wall board is heavily favored. Conse-

quently we can say that we are only the originators of the name by which wall board is known.

Nevertheless, the wall board industry belongs to America by virtue of development and production, for there are only about three wall boards manufactured in Europe and a few more in Canada; the remainder are the products of the United States.

It is pretty difficult to make a definite distinction between some wall boards and paper. Wood pulp wall board is comprised of almost exactly the same ingredients as the paper on which our newspapers are printed. The difference lies in the methods of manufacture. Those other wall boards of this class that are made of old newspapers, straw, rags and the like contain just what is in most pasteboards; and surely pasteboard is paper.

Now, paper has been for years the subject of the inventor's genius in numberless attempts to discover how it may be made to serve for glass, cloth, plaster, and so on. Success has rewarded their efforts in not a few instances, for we now drink from paper cups, use paper waste baskets, put paper on our roofs, wear paper clothes (in Japan); paper-filled railway-coach wheels carry us from coast to coast, statuettes and picture frames help to ornament our homes. It is said that even an entire church in Europe is built of this remarkable material in the form of papier-mache.

A material was patented some twenty-five years ago, built up of sheet metal overlaid with paper on both sides, for the construction of buildings, railway tunnels and railway carriages. In addition, about ten years earlier a patent was granted for an improved flooring or plain weather-sheathing consisting of four sheets of heavy paper pasted together. The inventor claimed that it possessed all the rigidity, durability and ability to resist abrasive wear that is found in any of the soft woods.

Yet wall board is not a substitute for any wall covering, although it may be a substitute when used in the capacity of furniture panels and for the many kindred purposes, particularly on account of its economy. In the same sense water paint is not a substitute for oil paint. Interior walls were plastered long before wood paneling came into favor; yet the latter is not a substitute. Like wall board, it was better suited to certain requirements. Frequently it was selected purely as a matter of taste and rejected as a matter of economy. In fine, any material which has a distinctive field of usefulness, be it large or small, is not a substitute for those materials which it may eject as a result of its particular fitness in that field.

No reference has been made to plaster board for the reason that it is not wall board, though used mostly as a wall covering. There is a sharp distinction between the two. That is in the fact that wall board is a finished wall covering, whereas plaster-board is not; it requires a thin coat of plaster to conceal the joints between the boards and to finish off the entire surface.

Legal Department

The Rights of an Architect

When an architect is engaged his contract of employment, if in writing, is just like other contracts of employment and the laws governing it are, of course, the same.

Oftentimes, or even perhaps in the majority of cases, however, the whole contract by which an architect is retained is included in a few words, such as when he is told to "Put your suggestions on paper," "Make some sketches" or "Go ahead."

The fact that there is no formal written document in a case like this does not mean that the architect is not entitled to compensation. In a case like this his engagement can be very favorably compared to the engagement of an attorney or of a physician, and, as in those cases, the law implies a promise on the part of the builder to pay what the services are reasonably worth.

In the case of an architect the contract for the erection of the building is very important, when his duties are to be ascertained, and he must exercise that care and skill which he has bound himself to observe. The custom and usage of architects also is important in certain cases where the architect's skill or diligence are called in question.

All readers are invited to ask any questions that will help them solve any legal difficulty that they may be in. Our legal adviser, George Kaiser, will answer direct by mail and give his opinion as to the correct procedure. Such of the questions and answers as are of general interest to the trade will be published in these columns.

All inquiries must be accompanied by the name and address of the correspondent, so that he may be answered direct or that he may be requested for further information if necessary to the intelligent answering of his question. No names will be published, only initials or a nom de plume. Remember that this service is free to subscribers.

Address Legal Department, Building Age, 243 West 39th Street, New York City.

The preparation and submission of plans in competition for prizes or upon the understanding that he shall be employed to carry them out if approved, give the architect no claim for compensation unless he is successful or receives the required approval. So, too, when plans are accepted conditionally upon the happening of an event, such as "the forming of a golf club" and the like, he is not entitled to pay for his work until the club is organized or the condition has been met with.

If the condition is that a "loan must be successfully made" or "if we can erect the building for $50,000," the result is the same: If the loan cannot be made or the building cannot be erected for that amount, the architect cannot recover for his services, and the time and labor put in on the work are wasted.

The plans when accepted, unless there is the usual reservation of ownership by the architect, become the property of the builder. After the work has been completed, however, it has become the universal practice of architects to keep their plans, and the question of their right to do so has apparently never been successfully questioned.

The fact that an architect is a professional man imposes a liability upon

him which he would not be subjected to if he were an ordinary clerk, laborer or employee.

A person who offers his services in any professional capacity contracts with his clients that:

First. He has the reasonable degree of skill ordinarily possessed by others in the same profession and commonly regarded as necessary.

Second. That he will use ordinary care and skill during the course of his employment in the work he is engaged to do.

Third. That he will use his best judgment in applying his skill and will be careful and diligent.

These representations apply only to a man's own profession, and if a person sees fit to employ an architect to tend him during sickness in place of a doctor or to engage a physician to conduct a case in court, while aware of the fact that the architect is not a doctor and that the doctor is not a lawyer, he is, of course, himself responsible for whatever unskillfulness is shown.

When a professional man is engaged to do the work of his own profession, however, he is liable in damages for his unskillfulness or negligence.

There is no warranty on the part of an architect or any other professional man that he is always absolutely correct in whatever he undertakes or that he is absolutely accurate in all his work. The lawyer may lose a case and say that he did the best that he could do; the doctor's patient may die and he is satisfied if he can say that there was no remedy that he knew of that he failed to try, and the architect guarantees neither the permanence of the building or the perfection of his plans. He is not called upon to do so any more than the doctor is required to guarantee a cure or the lawyer to warrant the winning of his case.

When it is contended that an architect exhibited a want of skill in the course of his employment or a want of due care, it is up to the person making the assertion to prove it.

Only reasonable care and diligence in the exercise of his skill and knowledge and the use of his best judgment are required in the course of his employment. The architect must exercise both, however, for no matter how skillful he may be he is responsible if he is negligent or dishonest in the exercise of his skill. Of course there is another very important obligation under which professional men are placed—that is to be honest.

If the architect omit any of the foregoing he can be held responsible for his omission, and the person whom he represents as a client need have no special agreement to that effect in order to avail himself of the carelessness, unskillfulness or dishonesty.

Exceeding authority, taking unnecessary risks and failing to do things which he has promised to do are good examples of want of care which will impose liability upon the architect who does or omits to do what is reasonably required of him.

Defective plans, defective foundations and defective chimneys are examples of unskillfulness for which the architect is liable and may have to pay damages to the builder.

The builder may offset the damages suffered against the amount due the architect in cases like these.

If Prevented from Completing Work, Contractor Can Recover

It was recently decided in the New York Supreme Court that a contractor who is prevented from completing his contract through no fault of his own but by the person who employs him, may recover for the work he has already done. The Court stated that the value of his services, up to the time he was prevented from continuing work, would be the full contract price, less the cost of completing the work.

When Materials Are Not According to Specifications

It was decided in a recent case that when suit is instituted to foreclose a mechanic's lien the fact that the architect has power "to determine the construction and meaning of the drawings and specifications" gives him the right to decide which shall govern in case of conflict between them regarding window sills and door glass.

Suit had been instituted by a contractor for the balance due for building a house.

The owner contended that the work had not been done according to the contract.

The Court, deciding in favor of the contractor, held that as there need only be a substantial compliance with the contract and as omissions and deviations were not due to bad faith but could be conveniently remedied and paid for by deductions from the contract price, the contractor was entitled to judgment even if he had used a different kind of locks from those specified in the contract.

Can Sub-Contractor Waive Right to Mechanics' Lien?

From A. H., New York.—Is it possible for a sub-contractor to waive his right to a mechanic's lien in New York? I know it is done in Chicago and St. Louis, but how about New York?

ANSWER:—A person of full age and sound mind can waive a mechanic's lien, and after it has once been waived it cannot be revised.

A sub-contractor whose contract with the principal contractor contains a stipulation that no lien shall be filed on his account is bound thereby, and cannot acquire a lien.

Can This Bill Be Collected?

From J. S. & S. J. R., Virginia.—We have a case now pending in court which will probably be decided during the third week of February.

The evidence is this: —— —— of this place contracted to erect a bungalow complete for $5,700. On his securing this work he employed us to do certain parts of this work, such as brick, concrete, stuccoing, plastering, tile setting, etc. At certain stages of the work the general contractor was to receive a certain part of his contract, four instalments to be paid at completion. We completed the brick work and stuccoing and had only received $300 from the contractor and he had received two payments. So we informed the owner that contractor was not coming across with his proper payments, and we would have to hold her responsible for balance due us. This was verbally. She advised us to complete her work and she would see us paid or become responsible, and on these grounds we completed all her work, including plastering and decorating, which ran our bill up to $1,150. But, before the building was completed, the architect and owner decided the contractor was not pushing the work satisfactorily and, taking advantage of a clause in the contract to the effect if work was not being pushed satisfactorily to take it out of the contractor's hands and have house completed, after which all bills being paid, the residue, if any, to go to contractor. But instead of balance for him, the contractor, there was a balance on wrong side of ledger of about $2,000. Though we felt no uneasiness about our account as we had the owner's promise, we made out itemized bill and carried it to the owner. She refused to pay, denying her promise, or if she did promise it was not intended to carry any further than the price of amount as stated in contract, $5,700. We have a witness as to her promise to us. The contractor has nothing in his own right. We have brought suit against the owner for the amount of $829. There are several mechanic's liens, and her attorney is trying to pool all these interests. We contend ours should be independent and are making a fight to that end. There is a balance of contract money to be paid out. The amount is $315, while when all claims are pooled and allowed they will be about $2,000. We are aware we failed to comply with the letter of the law, yet our attorney says he is confident of collecting his claim, placing his fee at $100 if he collects or $25 if he fails.—J. S. & S. J. Reynolds, Va.

ANSWER:—The estimated charges of your attorney are moderate enough for the amount of work he will have to do.

Have you any reason to doubt his judgment? If not, why not place yourself entirely in his hands. He is certainly the person best qualified to advise you because he is on the ground where all sources of necessary information are readily accessible.

In a case like this all BUILDING AGE can say is, see it through. Don't be bluffed out of your money without a fight. A written agreement, of course, would have put you in a better position, but why not make the best of it without it now that it is too late to remedy the fact that you haven't got it?

How to Find the Proper Size Wood Beams for Various Spans

A Set of Handy Tables Which Will Show the Builder How He Can Quickly Calculate the Proper Size Wood Beams for Various Classes of Structures at a Glance

By W. A. Giesen, Architect

THE ordinary carpenter or building contractor often does not know how to accurately figure the strength of wood beams or girders in connection with various frame constructions. He is therefore generally obliged to consult either an engineer or an architect who understands architectural engineering. As a rule, especially if the contractor calculates the size joists himself, the result is that the beams used are either too light or too heavy. Generally either a larger size or a closer spacing than necessary is used.

With the price of lumber as it is today, carpenters, contractors and those engaged in the business of erecting frame structures cannot afford to install larger timbers than are actually necessary to carry the weights imposed upon them, for by so doing a large sum of unnecessary money may be spent.

The following tables are intended as a guide for those who should know the size of timbers to be used for various spans, spacing and loadings. They are intended to help the builder get better and more economical construction as regards his joists.

TABLE I—EQUALLY DISTRIBUTED SAFE LOADS AND MAXIMUM SPANS OF WOODEN BEAMS

Class of Buildings		Residence Buildings, Dwellings, Tenements, Etc.		Office Buildings		School Buildings		Places of Public Assembly, Theatres, Churches, Dance-Halls, Etc.		Business Buildings, Factories, Stores, Storage		Roofs	
Material	Dimensions	12" on C.	16" on C.	12" on C.	16" on C.	12" on C.	16" on C.	12" on C.	16" on C.	12" on C.	16" on C.	12" on C.	16" on C.
Long leaf yellow pine	2"x 6"	14'-6"	12'-6"	12'-6"	10'-6"	11'-6"	10'-0"	10'-0"	8'-6"	9'-6"	8'-0"	15'-0"	13'-0"
	2"x 7"	16'-6"	14'-6"	14'-6"	12'-6"	13'-0"	11'-6"	12'-0"	10'-6"	11'-0"	9'-6"	17'-6"	15'-0"
	2"x 8"	10'-0"	16'-6"	16'-6"	14'-6"	15'-0"	13'-0"	13'-6"	11'-6"	12'-6"	11'-0"	20'-0"	18'-6"
	2"x 9"	22'-0"	19'-0"	19'-0"	16'-6"	17'-0"	15'-0"	15'-0"	13'-0"	14'-0"	12'-0"	22'-6"	19'-6"
	2"x10"	24'-0"	21'-0"	21'-0"	18'-6"	19'-0"	16'-6"	17'-0"	14'-6"	15'-6"	13'-6"	25'-0"	22'-0"
	2"x12"	.....	25'-0"	25'-0"	22'-0"	23'-0"	20'-0"	20'-6"	17'-6"	19'-0"	16'-6"	.....	26'-0"
	2"x14"	.....	.....	.....	25'-0"	.....	23'-0"	24'-0"	20'-6"	22'-0"	19'-0"	.....	.....
	2"x16"	.....	.....	.....	.....	.....	.....	27'-0"	23'-6"	25'-6"	22'-0"	.....	.....
Spruce.......	2"x 6"	12'-6"	10'-6"	10'-6"	9'-6"	10'-0"	8'-6"	8'-6"	7'-6"	8 -0"	.....	13 -0"	11'-0"
	2"x 7"	14'-6"	12'-6"	12'-6"	11'-0"	11'-6"	10'-0"	10'-0"	9'-0"	9'-6"	.....	15'-0"	13'-0"
	2"x 8"	16'-6"	14'-6"	14'-6"	12'-6"	13'-0"	11'-6"	11'-6"	10'-0"	11'-0"	9'-6"	17'-0"	15'-0"
	2"x 9"	19'-0"	16'-0"	16'-0"	14'-6"	15'-0"	13'-0"	13'-0"	11'-6"	12'-0"	10'-6"	19'-0"	17'-0"
	2"x10"	21'-0"	18'-0"	18'-0"	15'-6"	16'-6"	14'-6"	14'-6"	12'-6"	13'-6"	11'-6"	21'-6"	19'-0"
	2"x12"	25'-0"	21'-6"	21'-6"	19'-0"	20'-0"	17'-0"	17'-6"	15'-6"	16'-6"	14'-0"	26'-0"	23'-0"
	2"x14"	27'-0"	25'-6"	25'-6"	22'-0"	23'-0"	20'-0"	20'-6"	18'-0"	19'-0"	16'-6"	.....	26'-0"
	2"x16"	.....	.....	.....	25'-0"	26'-0"	23'-0"	23'-6"	20'-6"	21'-6"	19'-0"	.....	.....
Short leaf yellow pine	2"x 6"	11'-6"	10'-0"	10'-0"	8'-0"	9'-0"	7'-6"	8'-0"	.....	.....	.....	12'-0"	10'-6"
	2"x 7"	13'-6"	11'-6"	11'-6"	10'-0"	10'-6"	9'-6"	9'-6"	8'-0"	8'-6"	.....	14'-0"	12'-0"
	2"x 8"	15'-0"	13'-0"	13'-0"	11'-6"	12'-0"	10'-6"	10'-6"	9'-6"	10'-0"	8'-6"	18'-0"	14'-0"
	2"x 9"	17'-0"	15'-0"	15'-0"	13'-0"	13'-6"	11'-6"	12'-3"	10'-6"	11'-6"	9'-6"	18'-0"	15'-6"
	2"x10"	19'-0"	16'-0"	16'-6"	14'-0"	15'-0"	13'-0"	13'-6"	11'-6"	12'-6"	10'-6"	20'-0"	17'-0"
	2"x12"	23'-0"	20'-0"	20'-0"	17'-0"	18'-0"	15'-6"	16'-0"	14'-0"	15'-0"	13'-0"	24'-0"	21'-0"
	2"x14"	26'-0"	23'-0"	23'-0"	20'-0"	21'-0"	18'-6"	19'-0"	16'-6"	17'-6"	15'-0"	26'-0"	24'-0"
	2"x16"	.....	26'-0"	26'-0"	23'-0"	24'-0"	21'-0"	21'-6"	18'-6"	20'-0"	17'-0"	.....	26'-0"

TABLE II—EQUALLY DISTRIBUTED SAFE LOADS AND MAXIMUM SPANS OF WOODEN BEAMS

Class of Buildings		Residence Buildings, Dwellings, Tenements, Etc.		Office Buildings		School Buildings		Places of Public Assembly, Theatres, Churches, Dance-Halls, Etc.		Business Buildings, Factories, Stores, Storage		Roofs	
Material	Dimensions	12" on C.	16" on C.	12" on C.	16" on C.	12" on C.	16" on C.	12" on C.	16" on C.	12" on C.	16" on C.	16" on C.	20" on C.
Long leaf yellow pine	3"x 6"	18'-0"	15'-6"	15'-6"	13'-6"	14'-0"	12'-6"	13'-0"	11'-0"	11'-6"	10'-0"	16'-0"	14'-6"
	3"x 7"	21'-0"	18'-0"	18'-0"	15'-6"	16'-6"	14'-6"	15'-0"	13'-0"	14'-0"	12'-0"	19'-0"	17'-0"
	3"x 8"	24'-0"	20'-6"	20'-6"	18'-0"	19'-0"	16'-6"	17'-0"	14'-6"	16'-0"	13'-6"	21'-6"	19'-0"
	3"x 9"	26'-6"	23'-6"	23'-0"	20'-0"	21'-6"	18'-6"	19'-0"	16'-6"	17'-6"	15'-0"	24'-0"	21'-6"
	3"x10"	30'-0"	26'-0"	26'-0"	22'-6"	23'-6"	20'-6"	21'-0"	18'-0"	19'-6"	17'-0"	27'-0"	24'-0"
	3"x12"	.....	.....	.....	27'-0"	28'-6"	24'-6"	25'-0"	22'-0"	23'-6"	20'-6"	32'-6"	29'-0"
	3"x14"	.....	.....	.....	.....	.....	.....	29'-6"	25'-6"	27'-0"	23'-6"	.....	.....
	3"x16"	.....	.....	.....	.....	.....	.....	.....	.....	31'-0"	27'-0"	.....	.....
Spruce	3"x 6"	15'-6"	13'-6"	13'-6"	11'-6"	12'-6"	10'-6"	11'-0"	9'-0"	10'-0"	8'-6"	14'-0"	12'-6"
	3"x 7"	18'-0"	15'-6"	15'-6"	13'-6"	14'-6"	12'-6"	13'-0"	11'-0"	12'-0"	10'-0"	16'-6"	14'-6"
	3"x 8"	20'-6"	18'-0"	18'-0"	15'-6"	16'-6"	14'-0"	14'-6"	12'-6"	13'-6"	11'-6"	18'-6"	16'-6"
	3"x 9"	23'-6"	20'-0"	20'-0"	17'-6"	18'-6"	16'-0"	16'-6"	14'-0"	15'-0"	13'-0"	21'-0"	19'-0"
	3"x10"	26'-0"	22'-6"	22'-6"	19'-6"	20'-6"	18'-0"	18'-0"	16'-0"	17'-0"	14'-6"	23'-6"	21'-0"
	3"x12"	.....	27'-0"	27'-0"	23'-0"	24'-6"	21'-0"	22'-0"	19'-0"	20'-0"	17'-6"	28'-0"	25'-0"
	3"x14"	.....	.....	.....	.....	28'-6"	25'-0"	25'-6"	22'-0"	23'-6"	20'-6"	33'-0"	29'-0"
	3"x16"	.....	.....	.....	.....	.....	.....	29'-0"	25'-0"	27'-0"	23'-6"	.....	.....
Short leaf yellow pine	3"x 6"	14'-0"	12'-0"	12'-6"	10'-6"	11'-0"	10'-0"	10'-0"	8'-6"	9'-0"	8'-0"	13'-0"	11'-6"
	3"x 7"	16'-6"	14'-0"	14'-6"	12'-6"	13'-0"	11'-6"	11'-6"	10'-0"	11'-0"	9'-6"	15'-0"	13'-6"
	3"x 8"	19'-0"	16'-6"	16'-6"	14'-0"	15'-0"	13'-0"	13'-6"	11'-6"	12'-6"	10'-6"	17'-0"	15'-6"
	3"x 9"	21'-0"	18'-6"	18'-6"	16'-0"	17'-0"	14'-6"	15'-0"	13'-0"	14'-0"	12'-0"	19'-0"	17'-0"
	3"x10"	23'-6"	20'-6"	20'-6"	18'-0"	18'-6"	16'-0"	17'-0"	14'-6"	15'-6"	13'-6"	21'-6"	19'-0"
	3"x12"	28'-0"	24'-6"	24'-6"	21'-0"	22'-6"	19'-6"	20'-0"	17'-6"	18'-6"	16'-0"	26'-6"	23'-0"
	3"x14"	.....	.....	28'-6"	25'-0"	26'-6"	23'-0"	23'-6"	20'-0"	21'-6"	18'-6"	29'-6"	27'-0"
	3"x16"	.....	.....	.....	.....	.....	.....	27'-0"	23'-0"	24'-6"	21'-6"	.....	.....

Perhaps the best method of telling the reader how to use these tables is to present actual examples.

How the Tables Are Applied

Example: What size beams would be necessary for use in connection with a residence, the span between the bearing walls being 20 ft.?

Assume that long-leaf yellow pine is to be used, and that 2-in. joists placed 16 in. on centers are handiest. This would bring the problem into the scope of Table 1. It is necessary to find the depth of joist.

Find the heading "Residence Buildings." It will be noted that this heading is subdivided into 12 in. and 16 in. on center spacings. As we are going to use a 16-in. spacing, we glance down this column until we come to the figure nearest to the required span. We find 20 ft. midway between 19 ft. and 21 ft., so decide to follow the size indicated for a 21-ft. span. It is always better to take the number greater than the required span rather than the number less than the required span.

Now read to the left, and under the

column headed "Dimensions" we find that a 2 x 10-in. joist is adequate.

With a 12-in. spacing of joists the table shows that a 2 x 9-in. joist would be strong enough.

TABLE III—SAFE LOADS IN POUNDS PER SQUARE FOOT EQUALLY DISTRIBUTED ON WOOD BEAMS SPACED 16 INCHES ON CENTERS

SPANS IN FEET		8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
Material	Dimensions																			
Long leaf yellow pine 1600 lbs. per sq. in.	2"x 6"	150	119	96	79	67	57	49	43	37	33	30	27	24	22	20	. .	. .	. .	. .
	2"x 7"	204	161	131	108	91	77	67	58	51	45	41	36	33	29	27	25	23	21	19
	2"x 8"	267	211	171	141	119	101	87	76	67	59	56	47	43	39	35	32	30	27	25
	2"x 9"	337	267	216	178	150	128	110	96	85	75	67	60	54	49	45	41	38	37	32
	2"x10"	417	176	267	221	182	157	136	119	104	93	83	74	67	61	55	53	46	43	40
	2"x12"	600	477	384	317	267	227	176	171	150	133	119	106	96	87	80	72	67	62	57
	2"x14"	817	645	523	432	363	309	267	233	204	181	161	145	131	119	108	99	91	84	77
	2"x16"	1067	843	683	564	474	404	348	303	267	237	211	189	171	155	141	129	119	109	101
Spruce 1200 lbs. per sq. in.	2"x 6"	113	89	72	59	50	43	37	32	28	25	22	20	. .	. .	. .	. .	. .	. .	. .
	2"x 7"	153	121	98	81	68	58	50	43	38	34	30	27	28	22	20	. .	. .	. .	. .
	2"x 8"	200	158	128	106	89	76	65	57	50	44	39	35	32	29	27	24	22	20	. .
	2"x 9"	253	200	162	134	113	96	83	72	63	56	50	45	41	37	33	31	28	26	24
	2"x10"	313	247	200	165	137	119	102	89	78	69	61	55	50	45	41	38	35	32	29
	2"x12"	452	355	288	205	200	171	147	128	112	99	89	80	72	65	59	55	50	46	43
	2"x14"	613	483	392	321	272	232	200	173	152	136	120	109	99	88	80	74	68	63	58
	2"x16"	800	632	512	424	355	304	261	227	200	176	157	141	128	117	103	96	88	80	75
Short leaf yellow pine 1000 lbs. per sq. in.	2"x 6"	94	74	60	49	42	39	31	27	23	21	19	. .	. .	. .	. .	. .	. .	. .	. .
	2"x 7"	127	101	82	67	57	49	42	37	32	28	24	23	21	. .	. .	. .	. .	. .	. .
	2"x 8"	167	132	107	88	74	63	55	47	42	37	33	30	27	24	22	20	18	. .	. .
	2"x 9"	211	167	135	111	94	80	69	60	53	47	42	37	34	31	28	25	23	31	30
	2"x10"	261	206	167	133	116	99	85	74	65	57	51	46	42	38	35	31	29	27	21
	2"x12"	375	296	240	199	167	142	123	107	93	83	74	67	60	55	49	45	42	39	35
	2"x14"	510	405	327	270	227	193	167	145	128	113	101	91	82	74	67	61	57	52	48
	2"x16"	667	527	427	353	296	253	218	189	167	148	131	119	107	97	88	81	74	69	63

Note.—For 12 in. centres, add ⅓ to above values.
For 20 in. centres, deduct ⅕ from above values.

For 3-in. beams, add ½ to the above values.
For 1-in. beams, take ½ off the above values.

If spruce were to be used, we would refer to that part of Table 1 headed "Spruce." By the same process as just described for long-leaf yellow pine, we would find that 2 x 12-in. joists, placed 16 in. on centers, would be necessary for a 20-ft. span. If the joists were spaced 12 in. on centers, 2 x 10-in. joists would be used.

For short-leaf yellow pine, the table would show us that 2 x 12-in. joists would be necessary, either for a 16-in. or 12-in. spacing. Therefore the 16-in. spacing would undoubtedly be used as being more economical.

If a school building was to be built and the contractor desired to learn the proper size joists for a 16-in. span with long-leaf yellow pine joists, spaced 16 in. on centers, the same method would be followed. Only he would refer to the column headed "School Buildings." Glancing down the column headed "16 in. on Centers," he would find that 2 x 10-in. joists would be necessary for a 16-in. spacing and that 2 x 9-in. joists would be necessary for a 12-in. spacing.

Table 2 gives the same information when 3-in. joists are to be used, and the method of procedure is exactly the same as for 2-in. joists, just indicated in the description of Table 1.

The object of using the headings, "Residence Buildings, Dwellings, Tenements, Etc.," "Office Buildings," etc., is that each of these classes of buildings should be designed to bear a maximum load peculiar to the particular class of structure. As the load for each class of buildings varies, the size of joists must be varied to meet the requirements.

For these tables the joist sizes for residence buildings, dwellings, tenements, etc., have been calculated on a basis of 60 lb. per square foot; office buildings, 80 lb. per square foot; school buildings, 95 lb. per square foot; places of public assembly such as theaters, churches, dance halls, etc., 120 lb. per square foot; business buildings, factories, stores, storage places, etc., 140 lb. per square foot, and roofs at 55 lb. per square foot. These figures include both live and dead loads.

Long-leaf yellow pine is based upon a safe stress of 1600 lb. to the square inch; spruce upon 1200 lb. to the square inch, and short-leaf yellow pine upon a safe stress of 1000 lb. to the square inch.

The live load is the load due to furniture, people, etc. The dead load is the weight of the construction itself.

These tables can be used without hesitancy in the best practice, as they are calculated strictly in accordance with stresses called for in Chapter 5 of "The Code of Ordinances of the City of New York," or what is more generally known as "The New York City Building Code."

For convenience, Tables 3 and 4 are given herewith. Table 3 refers to 2-in. joists and Table 4 to 3-in. joists. These tables give the safe load that various sized joists will bear for certain spans. The spans in feet are given at the top of the tables, and it is merely necessary to glance along from the column "Dimensions" (giving the joist sizes) to the length of span in order to find out the safe load.

For instance, suppose it is necessary to find out what safe load a 2 x 8-in. joist will carry on a 14-ft. span. Taking the column "Dimensions," at the line 2 x 8, we glance across until we come to the column "14 ft.," and find that 87 lb. per square foot is the safe load.

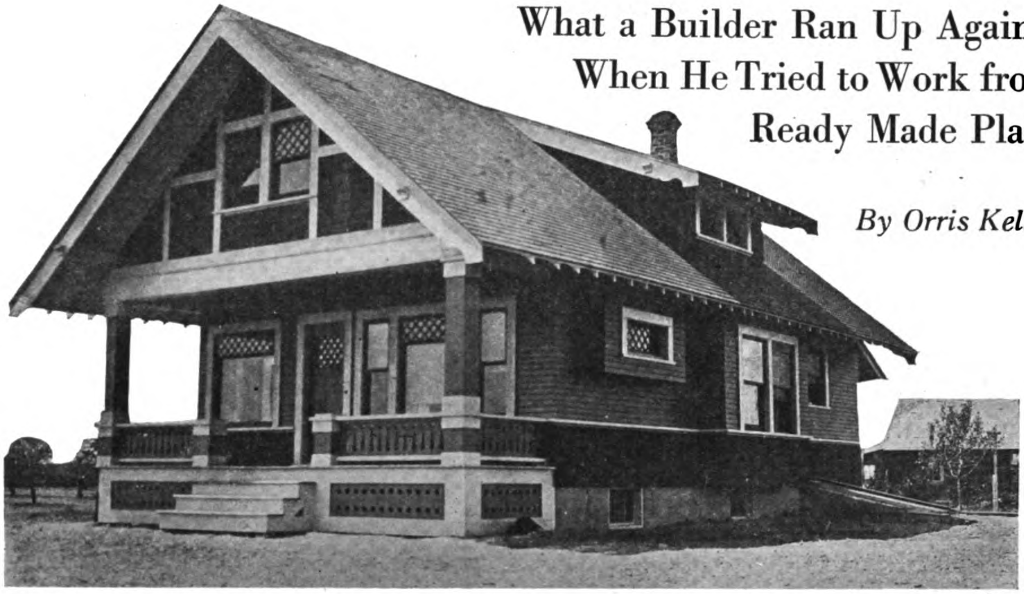
TABLE IV—SAFE LOADS IN POUNDS PER SQUARE FOOT EQUALLY DISTRIBUTED ON WOOD BEAMS SPACED 16 INCHES ON CENTERS

SPANS IN FEET		8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
Material	Dimensions																			
Long leaf yellow pine	3"x 6"	225	178	144	119	100	86	73	64	56	50	45	40	36	33	30	. .	. .	. .	. .
	3"x 7"	306	242	196	162	136	116	100	87	77	68	61	54	49	44	40	37	34	32	29
	3"x 8"	400	316	256	212	178	151	131	114	100	89	79	71	64	58	53	48	45	41	38
	3"x 9"	506	400	324	267	225	192	165	144	127	112	100	90	81	73	67	61	57	51	48
	3"x10"	625	494	400	331	278	236	204	178	156	139	124	111	100	91	83	80	69	64	60
	3"x12"	900	711	576	476	400	341	294	256	225	200	178	159	144	131	120	108	100	93	86
	3"x14"	1225	968	784	648	544	464	400	349	306	271	242	217	196	178	162	149	136	126	116
	3"x16"	1600	1264	1024	846	711	606	522	455	400	355	316	284	256	232	211	194	178	164	151
Spruce	3"x 6"	169	133	108	89	75	64	55	48	42	37	33	30	. .	. .	. .	. .	. .	. .	. .
	3"x 7"	230	181	147	121	102	87	75	65	57	51	45	41	37	33	30	. .	. .	. .	. .
	3"x 8"	300	237	192	159	133	114	98	85	75	66	59	53	48	44	40	36	33	30	. .
	3"x 9"	380	300	243	201	169	144	124	108	95	84	75	68	61	55	50	46	42	39	36
	3"x10"	469	370	300	248	208	178	153	133	117	103	92	83	75	68	62	57	52	48	44
	3"x12"	678	532	432	357	300	256	220	192	168	148	133	120	108	97	89	82	75	69	64
	3"x14"	920	724	588	484	408	348	300	260	228	204	180	164	148	132	120	111	102	94	87
	3"x16"	1200	948	768	636	533	456	392	340	300	264	236	212	192	176	160	144	132	120	113
Short leaf yellow pine	3"x 6"	141	111	90	74	63	53	46	40	35	31	28	. .	. .	. .	. .	. .	. .	. .	. .
	3"x 7"	191	152	123	101	85	73	63	55	48	42	38	34	31	. .	. .	. .	. .	. .	. .
	3"x 8"	250	198	160	132	111	95	82	71	63	55	49	45	40	36	33	30	27	. .	. .
	3"x 9"	316	250	203	167	141	120	103	90	79	70	63	56	51	46	42	38	35	32	30
	3"x10"	391	309	250	206	174	148	128	111	98	86	77	69	63	57	52	47	43	40	37
	3"x12"	562	444	360	298	250	213	184	160	140	125	111	100	90	82	74	68	63	58	53
	3"x14"	765	608	490	405	340	290	250	218	192	170	152	136	123	111	101	92	85	78	72
	3"x16"	1000	791	640	529	444	380	327	284	250	222	197	179	160	145	132	121	111	103	95

An Experience in Cottage Building

What a Builder Ran Up Against When He Tried to Work from Ready Made Plans

By Orris Kellar



The Cottage as It Appeared When Completed in Spite of the Plans

IN a recent issue of the paper some one writing for the benefit of the craft—I have just forgotten who he was—told how the technical man loved to meet a practical man who understood technical terms. I have no doubt this is true. but how many of you practical men love to meet the technical man who can be practical as well?

The job which I have just finished brought this idea to me so forcibly that I have decided to write something about it for the readers of the BUILDING AGE. I am sending blue prints just as they were given to me from which to do the work, and here I would remark that the plan was not drawn by some "kid" who had taken a correspondence-school course, but by a ready-made plan concern which makes a business of furnishing plans and bills of materials to those who desire them. The lumber company with which I did business has yards located in several towns and villages in three states, and furnishes for a stated sum the plans and all building materials except hardware, paint and plumbing.

About the first thing I do when I have a building of this size or style to figure on is to grab the scale rule and start for the stairway. If there is any trouble on this job you will find part of it there.

Yes, sir, I found it! Seven and a half foot run and 9½-ft. rise. Some ladder, all right! But then the second floor was only an attic, unfinished, so perhaps it would do. Then I found a loose leaf which said, "Second floor redesigned." Here was a hall, three bedrooms and three closets. A stair then with a 6-in. tread and an 8-in. riser was clearly out of the question so with the scale rule I began a systematic search for errors from the basement up.

The next one I found was at the top of the basement stairs where a 2 ft. 8 in. door was swung between partitions set 3 ft. on centers. The detail cabinet work in the kitchen would not fit the floor plan, so I proceeded to the second floor that had been "redesigned" and found a nightmare for a week afterward. The bedroom at the end of the hall was all right and the hall partition set 4 ft. on centers, which made a nice wide hall for a small house. But the bedroom at the left of the hall was so narrow that you could not put a bed in it without setting it tight against the wall, in front of the windows, and even then you could not get the closet door open. The ceiling was only 5 ft. 6 in. high at the plate and one corner of the closet door would have to be sawed off before it would shut. The opposite bedroom was large enough to get a bed into it but the ceiling was the same height and the closet door could not be more than 3 ft. 6 in. high. The detail of the porch shows a 22-ft. span with two 2 x 10's spiked together and no trussing of any sort.

I took the plans back to the owner and pointed these errors out to him. He hitched up the little Ford and we went to the lumber yard. Strange to say, no one, not even my competitors, had discovered that there was anything wrong in the plan.

The lumber company allowed us to make what changes were necessary and they would stand the material bill.

We had a saddle washer made to fit the point of the rafters and drop a ⅝-in. rod down through the pocket of the mullion window to the porch soffit to support the center of the 22-ft. span.

We kept the outside walls the original height and dropped the second-floor joist 6 in. We set the hall partitions 3 ft. on centers and extended each outside dormer wall 1 ft. We put in four windows at the top of the stairs, lathed and plastered the closets and made a pretty respectable second story of it, except the ceilings are low.

We made some other changes, also. We left out the laundry tubs and built a cupboard under the drain board; built a wood lift and put the hot-water boiler above it. We put sliding doors between the dining room and the living room with bookcases between the living room and the den.

After the contract was signed I asked the lumbermen if there would be extra stuff enough to make some saw horses. No, there would not, but there would be plenty to finish the job.

"Yes, sir," they said, "there will be just enough of everything."

"Why, this material has been figured and checked by three experts!" so they told me. I knew they must be "experts," for that is a great deal closer than I can figure. But they were so confident about it that they agreed to allow me to finish the job before they received any money.

The specifications said that the joists should be doubled under all bearing partitions. Had I done so, I would have had nothing left for headers around the openings. For a few days everything went along nicely, and then we ran out of 2 x 4's. In fact, we were about 1100 ft. short before we were through. The shiplap for the sub-floors and rough siding came out pretty nearly even. They had sent 18-ft. stuff for the rafters and barge boards, which was about 5½ in. too short for the rafters and nearly a foot for the barge boards, after the plumb cut was put on them. The barges on the dormers were also short.

We had nearly a 1000 ft. of roof sheathing that we did not need but we had only 220 ft. of V-ceiling where we needed 1300. We used ceiling on the rafter ends and out to the barge boards.

We sent back for six bunches of shingles. We used rustic in the place of lap siding and had about 200 ft. more than we used; also about the same of flooring.

There was nothing for the sill course running with the bottom of the windows so we got that out by hand. We were short one window. We needed 56 sash weights and they sent us only 22.

We had 360 lineal feet of outside door jambs but nothing for the inside. The casing and base were figured pretty close but 1 x 6 for heads, etc., was lacking to the extent of 350 ft.

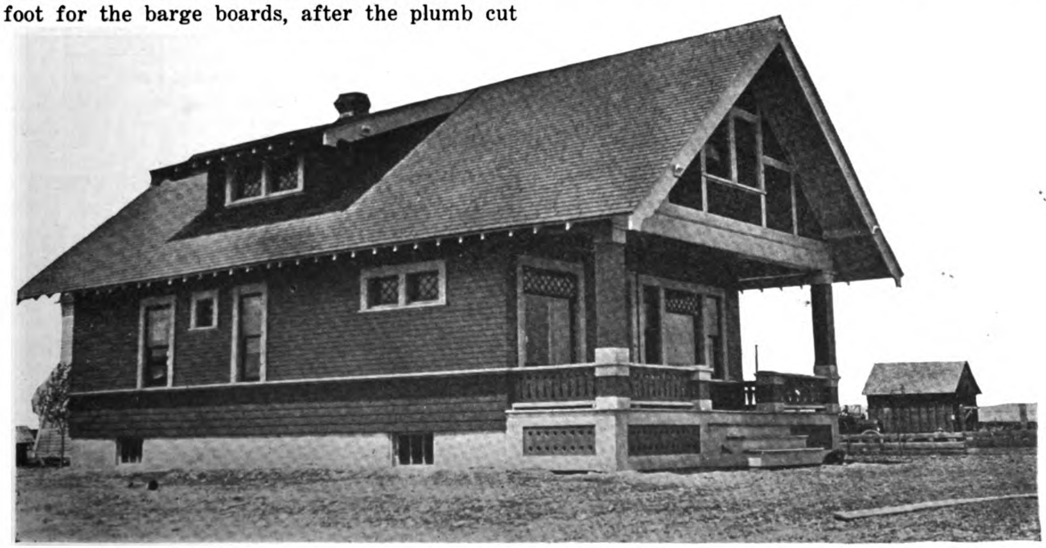
There was nothing at all for the kitchen work. Numerous other small things such as moldings, etc., would fall short from a few feet to a hundred or more, or may be overrun that much.

The lumber company made up the deficiencies and kept a smiling face—most of the time. I do not know where the fault lies, but evidently some one made a mistake, and as they were to put the entire bill in one car it was very annoying to keep sending to the local yard for the things that were short.

I have sometimes wondered if the quantity surveyors we hear about figure everything exact or if there is enough extra that a fellow dare make a pair of saw horses.

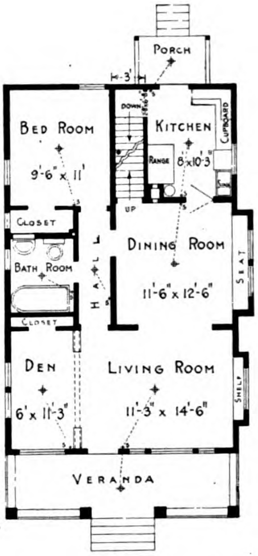
The doors leading to the basement shown on the right elevation of the cottage were added to the original drawings; otherwise the outside was built in accordance with the blue prints.

I might say that in connection with the lumber company in question which makes a specialty of furnishing plans and bills of material, that it was

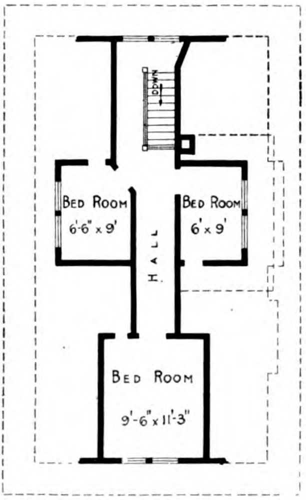


Another View of the Cottage

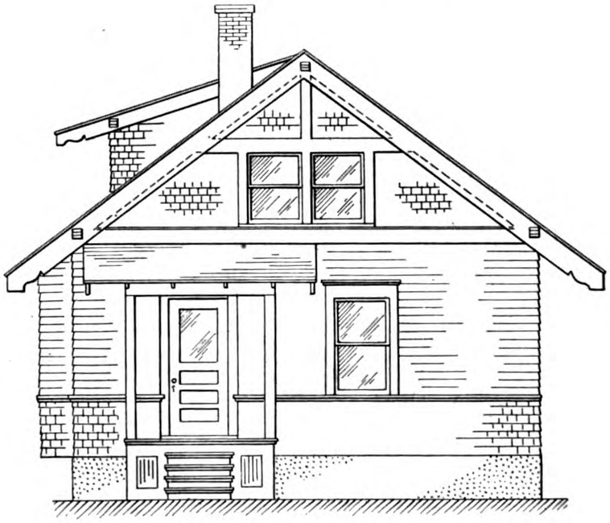
Front Elevation, Scale 1/3" to the Foot



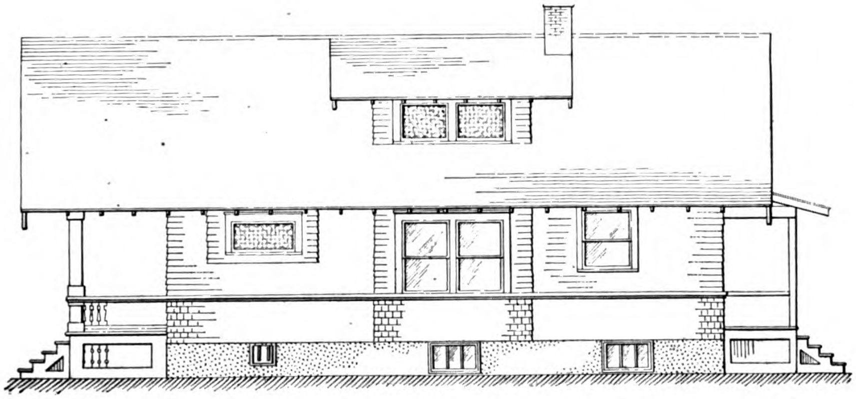
Main Floor Plan, Scale 1/16" to the Foot



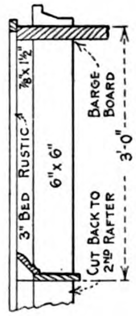
Attic Floor Plan, Scale 1/16" to the Foot



Rear Elevation, Scale ⅛" to the Foot



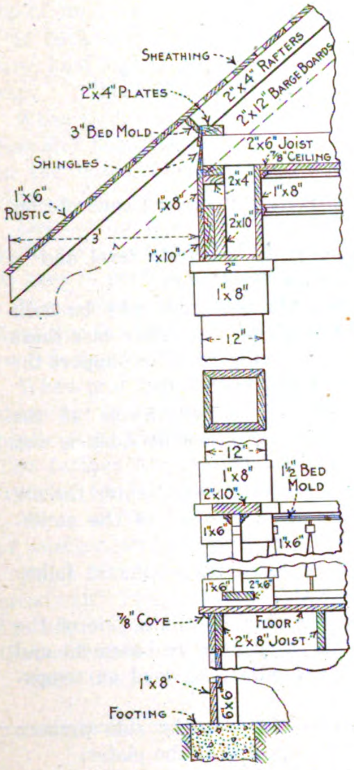
Right Side Elevation, Scale 3/32" to the Foot



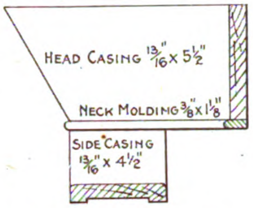
Detail of Gable Bracket, Scale ½" to the Foot

my first experience. The house is well built, with all the conveniences that generally go with that style of dwelling, and is the first house in this Neck-o'-the-Woods to be furnished with electric lights. It is fitted with the "Delco" system. It has full basement with concrete floor.

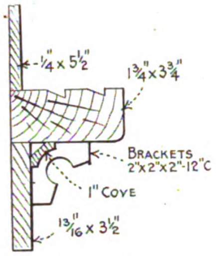
The inside trim is fir, stained a light oak, then given a coat of shellac and one of varnish. The outside has two coats of paint except the shingles, which have one coat of oil and Venetian red, toned with black in some places. The cost of the cottage as here described was about $1,900.



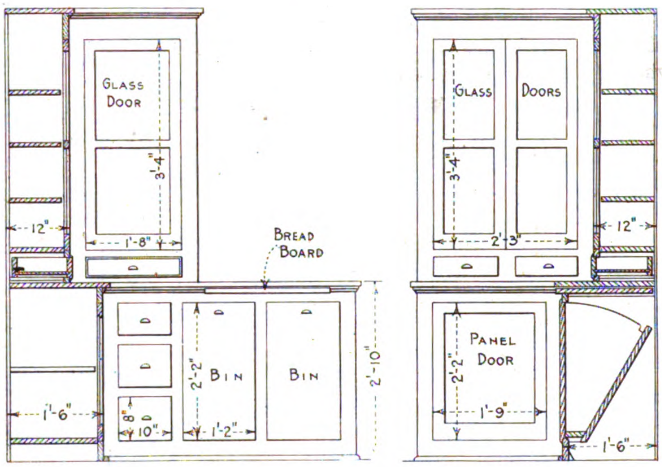
Section Thru Veranda Showing Details of Main Cornice, Scale ⅜" to the Foot



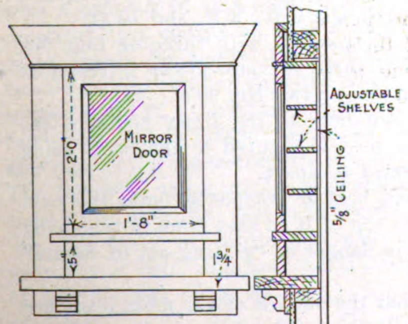
Details of Interior Trim, Scale ½" to the Foot



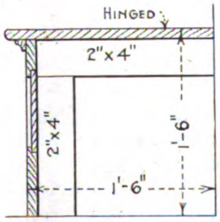
Section of Plate Rail in Dining Room



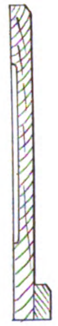
Elevations and Sections of Kitchen Cupboards, Scale ⅜" to the Foot



Elevation and Section of Medicine Cabinet, Scale 1" to the Foot



Section of Seat, Scale ¾" to the Foot

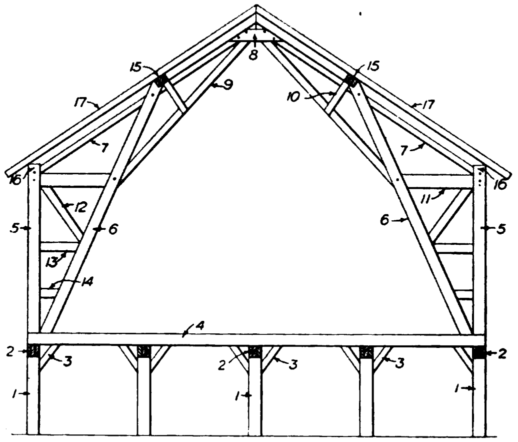


Base, Scale 3" to the Foot

How a Successful Builder Frames the Barns He Builds

A Practical Description of the Manner in which the Work Is Done

WHILE every builder may have his own particular method of executing a certain piece of work, there is the possibility that it is not always the most rapid and economical as regards time consumed, material used and labor required. He is without doubt most anxious to know what experience has taught others in regard to various phases of the building business, and he is therefore likely to be interested in the instructions which are here presented for framing and raising what is known as a Shawver Plank Frame. It is the system of barn construction which has been advocated for so many years by John L. Shawver & Brother, Bellefontaine, Ohio, and represents the results of a wide and successful practice in this particular line of work. While the various members of which a barn bent consists are familiar to the practical man, it may be interesting to the carpenter who aspires to become a contracting builder to note the names by which these members are designated in the interior bent of a Shawver plank frame as here shown.



The Barns Are Framed Like This

Referring to the drawing the members marked 1, 1, 1 are the posts of the basement, 2 are girders, 3 braces, 4 sill of superstructure, 5 post, 6 purlin post, 7 roof support, 8 collar beams, 9 sub-support, 10 star, 11 main tie, 12 brace, 13 and 14 ties, 15 purlin plate, 16 main plate, 17 rafters. The instructions are as follows:

The foundations may be walls or pillars, but in either case should be solid and substantial.

These walls or pillars may be of stone, brick, building blocks, or concrete, stone and concrete being preferable.

The foundations must be perfectly level and in good shape to receive the wood work.

If a basement barn, the basement may be built of square timbers or of plank. In either case there should be sufficient posts and girders to support the floor above and weight placed thereon.

The girders should extend lengthwise of the building in all cases, and the basement must be well braced.

The end braces of basement should enter the sill of the basement as well as the sill of the superstructure.

If the basement is constructed of plank, follow the model in every detail.

When the basement is complete build one of the end bents with its sills in position on basement and the rest of the bent extending outward on temporary piers.

Allow 2 in. on either side for the side timbers and allow 2 in. on top of posts for the plates.

Should any of the planks be over 2 in. thick, size down to the required thickness.

The sills of the superstructure should be sized down to some given width at all points where resting on wall sills or girders, and the upper surface made true to receive the flooring.

Be careful to get the bent built perfectly square, using line and triangle 6 ft., 8 ft. and 10 ft.

Secure each intersection with three or four No. 20 spikes, and if three or more pieces intersect at same point add one or two No. 60's.

Secure the stiffeners to the inner plank of the post before the post is secured to the bent, using No. 60's not over 2 ft. apart.

When the end bent is completed build the next bent directly on top of it to save time in "squaring up" and to avoid danger of "getting out of square" while building.

Remember that the outside of the main posts are "face side," while the inside of the purlin posts are "face side."

The upper side of the roof supports are "face side"; the lower edge of the collar beams and the stays are "face side."

The shoulder that supports the purlin plates are made by cutting down 4 in. into the purlin posts on the line with the roof supports, then cut at right angles. The stays are put on at right angles with the roof supports.

The purlin plates are usually placed so that the

space between the plates and the purlins is three-fifths of the total distance from plate to comb or peak or nearly so. Place half-inch bolts at the points marked with a "dot" on the drawing.

If a loft is to be put in, place the necessary joist bearers in bent as shown in model, observing that top of joist bearers are "face side."

If decks are desired over driveway, place necessary joist bearers in bents that adjoin the driveway.

When this bent is completed place rollers 4 in. in diameter beneath the posts and slide the bent over on the basement till its sill comes to its proper place.

Level it up to avoid any strain; then proceed to build next bent directly on top of it, being careful to keep it perfectly square.

Many make the mistake of using timbers too light for the purlin plates, and when these sag the roof is out of line.

When post facings are found in bill of materials these are to be used to face the inside edge of all purlin posts that are free from sill to purlin plates. The facings are seldom used if joist bearers are inserted for lofts or decks.

When all the bents are made, cut the side timbers of selected, straight and even thickness plank.

Raise first the bent last made, using guy ropes to steady it. Plumb it with care from both sides of the structure. Stay it securely with long plank that will keep it in position.

Raise the next bent and place plates; then raise the next bent and place plates, etc., just as before.

When all bents are up, place side sills, nailers, intermediates, braces, cap plates, purlins, couplings, etc.

When slate is to be used for roof the intermediates are usually doubled or made extra heavy.

Use 2 x 8 or 2 x 10 nailers over large doors as indicated in model, duplicating inside of the posts, which gives a solid support for the track.

Run 1 x 4-in. braces on lower edge of rafters, starting near top of corner posts and angling across to top of purlin post of adjoining bent. Brace each succeeding span in similar manner.

The plates are made in sections on the ground and when the cap plates are put on the "joints are broken."

The purlins are taken up piece at a time and "joints are broken" by the couplings.

The truss rods are inserted, as shown in the models. Some use seven strands of No. 8 galvanized wire, inserted in a similar manner and twisted.

When the barns are 36 ft. or more in width beam braces are used in addition to the truss rods or cables. Extra care must be used if the barn is over 44 ft. wide. The side timbers are put on with No. 40 spikes. Make all braces fit snug, and secure each intersection with necessary spikes.

If the barn is a "Yankee," "flat" or "ground" barn and is to have any plank floors the necessary supports for such floors must be provided in the form of mud sills or stone walls.

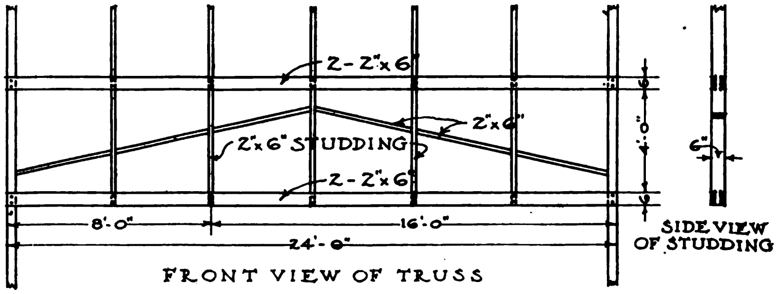
Bridging the Wide Span

By E. V. Laughlin

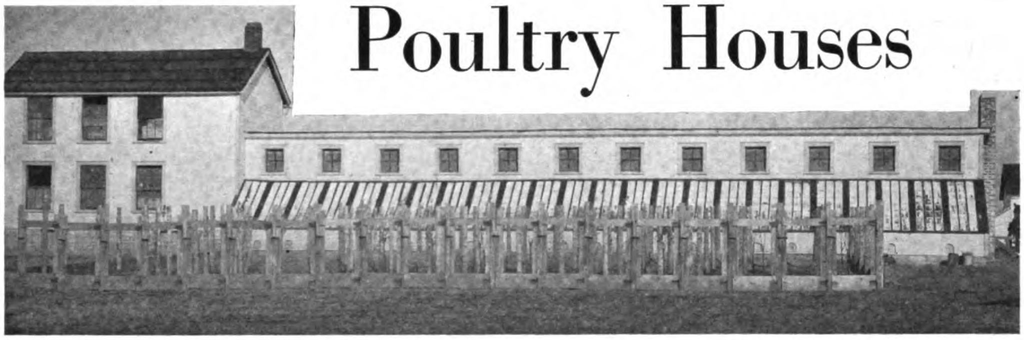
BRIDGING a rather wide span in such a way that there may be no sagging sometimes becomes a perplexing problem. I was confronted with a problem of this kind some years ago, when constructing a college building that was to be used quite largely for auditorium purposes. It was desirable in this building that the stage opening have a span of 24 ft. Carrying across this distance became additionally difficult because a very considerable part of the superstructure was to be just above. The following truss structure enabled me to overcome this difficulty very effectively. The building has been in continuous use more than a year and a half, and not the slightest indication of sagging has made its appearance.

The studding used in this truss structure was 2 in. by 6 in. scantling. The bottom of each was cut away sufficiently to receive 2-in. by 6-in. girths, a 16 and an 8-ft. stick making the run on one side and an 8 and a 16 on the other side, thus breaking joints effectively. Four feet higher the arrangement was duplicated. Pieces of 2 in. by 6 in. were then headed rafter fashion between the studding, thus making it impossible for the structure to settle. Careful measurements indicate that the center of the truss is just as far from the floor as it was before the staging supports were removed.

Particular attention should be given that the incisions in the studding for the girths be tight fitting, for this prevents any slight sagging. The same caution applies to the headers between the studding. They should be tight enough to require gentle forcing to put into place. Attention to these details assures the adequacy of the truss.



FRONT VIEW OF TRUSS



Poultry Houses

Fig. 1—Single Brooder House with Feed Room and Incubator House at the Left

Some Types of Poultry Houses Built in the West. They Are Simple of Construction, and Have Ample Provision for Lighting and Ventilation

THE carpenter and builder who is seeking opportunities for profitable expansion in farming communities should carefully consider the construction of poultry houses and allied work of a miscellaneous character. These buildings are usually very simple in design and construction, and a little experience in this line will qualify a contractor to make suggestions of value to his clients to enable him to figure his costs on a sounder basis as a result of his activities. No particular style of building is peculiarly adapted to any section of the country, but the prime essentials in poultry houses are sound construction and dryness, with particular attention paid to provisions for fresh air and sunlight and sufficient space to house the birds comfortably. A house which gives satisfaction in Maine will also give good results in California or Texas, but it is preferable to build more open and consequently less expensive houses in the South than in the North.

The poultry houses illustrated herewith are de-

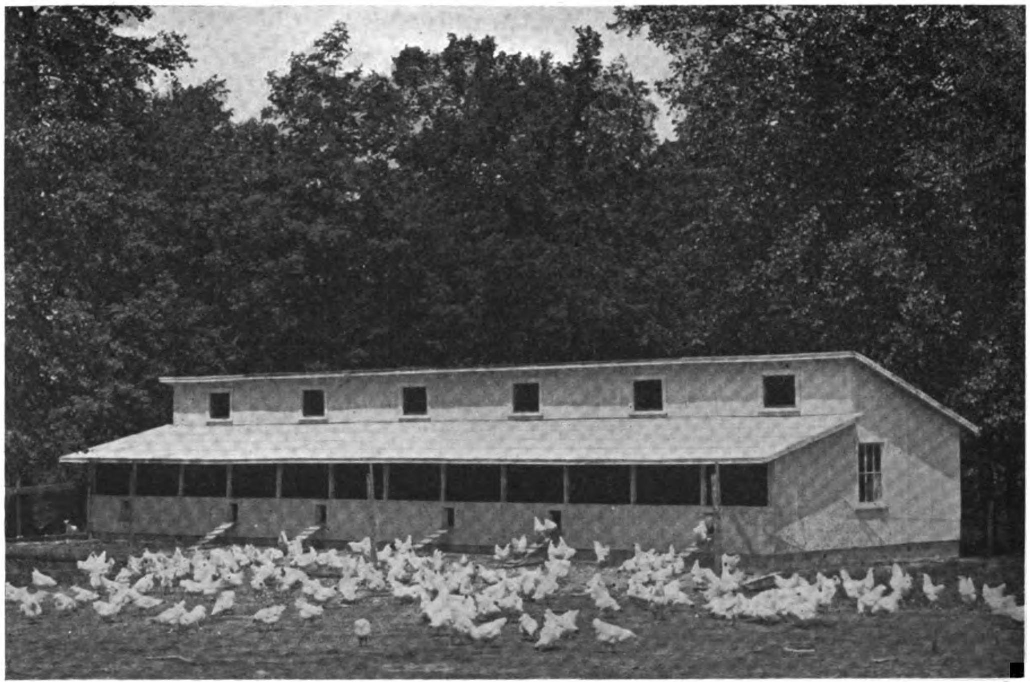


Fig. 2—A Good Example of Semi-Monitor Type of Colony Poultry House

signed with headroom where it is needed for the convenience of the attendant, the roofs sloping toward the back, where the roosts, nests and dropping boards are built, and where headroom is not necessary. All exposures are south. Different types of roofs are built according to the nature of the building and local conditions, the commonest being the shed or single slope, gable, monitor and semi-monitor. The gable roof is used extensively for brooder houses and incubator cellars, east and west exposures being usually selected. The semi-monitor type of house is considered best for structures arranged with an alley, and is often employed in the construction of colony and single brooder houses. The amount of floor space depends largely on the system followed by the poultryman, the size of the pens, weather conditions, and the size of the birds. One expert has suggested that 1 sq. ft. of open front for every six or seven birds, or 30 to 35 sq. ft. of floor space, is sufficient for conditions where plenty of ventilation is demanded in cold weather.

Good construction has much to do with the successful raising of birds. Concrete foundations, extended above grade, are considered best and cheapest in the long run, in that they are permanent, vermin proof, and will not rot. Concrete floors may be easily kept clean, and have many other advantages, but some poultrymen prefer floors of matched boards, or even gravel. Success is assured where strict attenton is paid to the design of the front of the building so that the windows or openings will allow the sun to shine well back into the house during the winter months. In many instances, windows are entirely dispensed with, and muslin screens substituted to keep out direct drafts.

A two-story frame poultry house of the scratching-pen and roosting-room type is illustrated in Fig. 3. The building is 18 ft. long, 14 ft. wide, and 14 ft. high, with a south frontage, and provided with plenty of headroom at the south. Each floor is divided into two equal compartments, each section being designed to accommodate about 25 to 30 fowls. For each pen one window, 24x28 in., and two openings covered with 1-in. netting of slightly larger dimensions, are provided at a height of 3 ft. from the floor, to keep out direct drafts. Muslin screens for each pair of openings are installed, and hinged to swing backward, where they may be caught at the ceiling when not in use.

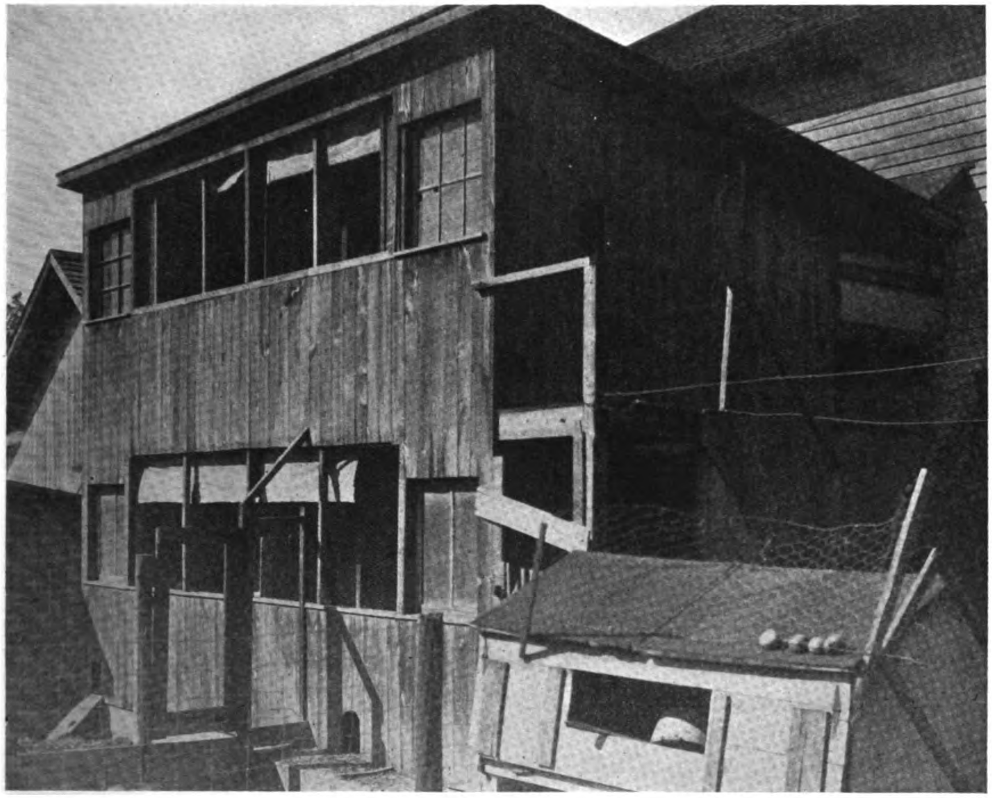


Fig. 3—Two Story Poultry House of the Scratching Pen and Roosting Room Type

The accompanying floor plan illustrates the arrangement of the pens, roosts, nests, etc. Windows and openings are provided on the south side only, with the exception of a 2 x 4-ft. opening beneath the roosts on the east end of the building, which allows a more complete circulation of fresh air.

The roosts and dropping boards are built against the north wall, and are 3 ft. from the floor, the

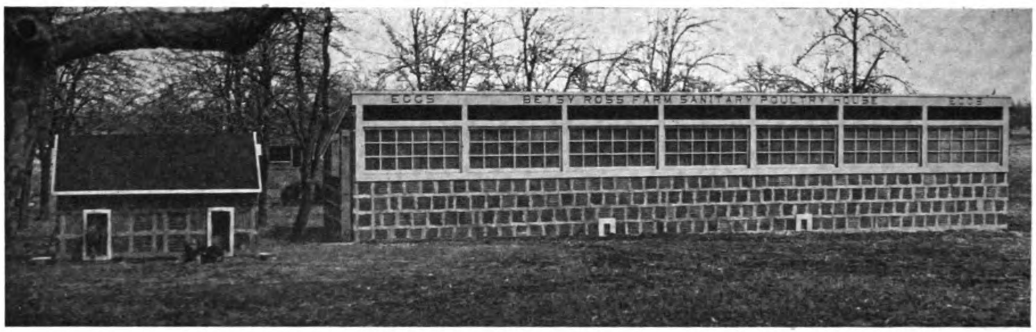


Fig. 4—Poultry House of the Shed Type Built of "Natco" Tile and Without Plaster Coat

roosts being hinged to swing backward to facilitate cleaning the dropping boards. Each dropping board has a wooden gutter 10 in. wide and 4 in. deep, into which the wastes may be swept and removed later. The roosts and dropping boards are built the full width of each pen, the former consisting of 2 x 3-in. scantling, with the tops rounded off, and the latter of common boards in 9-ft. lengths.

The dry mash hopper and grit boxes are installed at the partition, in order to serve both pens at the same time, both at a convenient height. The hopper is 4 ft. 6 in. high, 2 ft. 6 in. long, and 13½ in. deep, with hinged top. The grit box is arranged with four compartments, and has over-all dimensions of 4 ft. 6 in. long, 18 in. high and 8 in. deep, all built of common lumber. The nests are built on the walls, all lumber being planed on the inside of the nests.

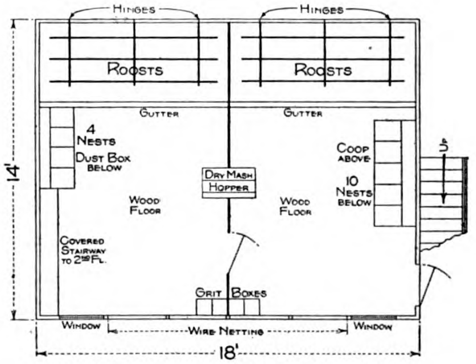
The partition between the pens consists of two 1 x 8-in. boards on centers, resting on a wooden floor, with 2-in. netting to the ceiling, a 2 x 6-ft. door being also provided. The studding, sills, plates, rafters, and other structural members, are of ordinary dimensions, put together in the regular way.

A good grade of prepared roll roofing is used, the roof pitched toward the north at a slight angle.

Colony houses of the semi-monitor type, with open fronts, to be found in southern Indiana, are illustrated in Figs. 1 and 2. The size of these buildings varies according to requirements, but a building measuring 14 x 20 ft. is utilized to house from 40 to 65 birds. A structure of this size has a 3-ft. wall in the front and 4 ft. at the back, with an extreme height of 7 ft. above the upper tier of windows or openings. Concrete foundations having proportions of 1:2½:5 have been found satisfactory, while the floors, sheathing and siding are all shiplap. The structural members consist of studs, plates, posts and rafters of 2 x 4 material and 2 x 6 sills. Rubberoid roofing is used on both roofs, exterior woodwork receiving two coats of white paint.

A poultry house of the shed type, built of Natco tile, unplastered, is illustrated in Fig. 4. This building is substantially constructed, and designed to afford an abundance of light and ventilation. The roof is well pitched to the north. A poultry house of this construction is capable of withstanding the severest weather, and will need very little expense for maintenance.

A one-story frame single-brooder house of the semi-monitor type, with an adjacent two-story gable-roof house accommodating feed rooms and an incubator cellar, is shown in Fig. 5. The brooder house is 85 ft. long and 15 ft. wide, with a south frontage and an entrance on the east side. This is large enough to accommodate twenty brooders, each of which has a pen and run. The heating equipment for the brooders is installed in a concrete pit 3 ft. 6 in. deep at the east end of the building.



Plan of First and Second Floors of Poultry House Shown in Fig. 3

A 3-ft. alley runs the length of the building on the north side, to the left of which are the brooders and pens. The building is lighted and ventilated by a tier of twelve windows over the pens, or about one for every two pens. Sloping windows in groups of three rows are shown in the accompanying illustration, twenty-four small panes of glass for each pen providing ample facilities for lighting.

The brooder house has foundations of concrete in the proportions of 1:3:5, which are extended above grade to a height of 12 in. The floor throughout is of concrete, without a top dressing. Concrete blocks are used in building the incubator cellar, and on the inside are left in their rough state. Wood is used throughout in the construction of

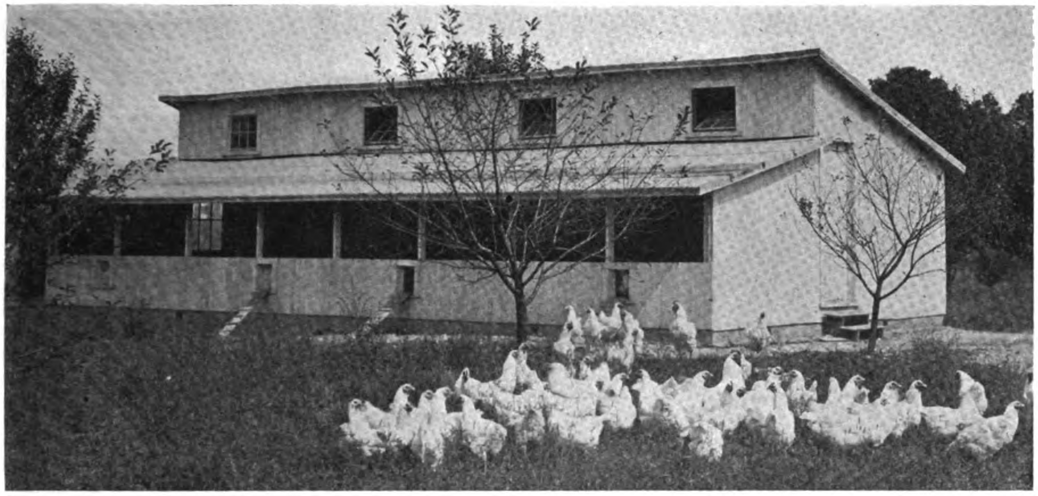


Fig. 5—A One-Story Frame Single Brooder House of Semi-Monitor Type

the building, for brooders, scratching-pen floors, partitions, etc.

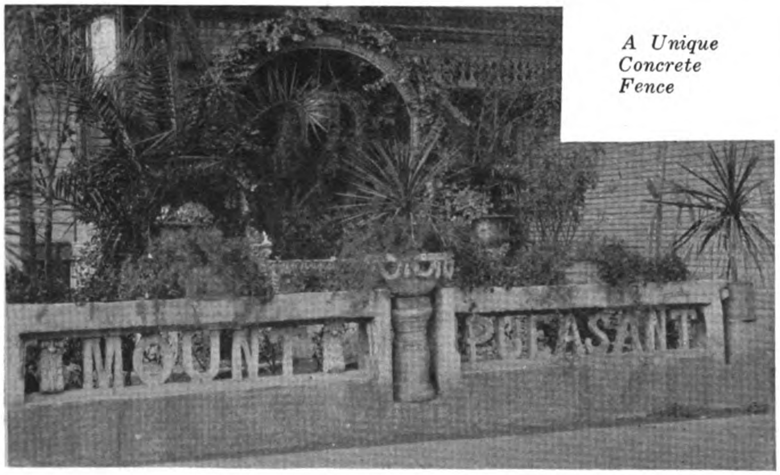
The brooders are installed on frame stands at a height of 2 ft. from the floor and are grouped in pairs, with an opening between, allowing the attendant to reach the pens. Each brooder is 3 ft. square and 12 in. deep, the top being hinged to swing backward, and covered with ½-in. netting. At the back of the brooder is a 3 x 36-in. door, sliding upward, giving the bird access to the pen. The pens are 4 ft. wide and 9 ft. long. The top windows and doors to the runs are operated individually over pulleys from the alley, and much time is saved than would be the case if the attendant were compelled to enter each pen. Partitions between the pens are formed by 1 x 12 boards on centers at the floor, with 1-in. netting to a height of 3 ft., and 2½-in. netting to the roof. At the west end of the brooder house are stairs to the feed rooms and incubator cellar. Roofs are covered with prepared roofing and one coat of paint given exterior woodwork.

A Unique Fence for the Home

By Albert Marple

THE novel front fence shown in the accompanying illustration is probably the most unique structure of its kind to be found in Los Angeles, Cal. Its principal unusual feature is that the name of the home place itself is spelled in large letters, which constitute a large part of the fence.

This feature is about 3½ ft. in height and about 20 ft. long. It is made entirely of concrete. The lower section of the fence is taken up by a solid wall effect, as is the cap across the top, while the letters forming the name of the place, "Mount Pleasant," occupy the space intervening. The letters are about 1½ ft. in height and 6 in. thick, this being half the thickness of the wall or fence. The exterior of this entire feature has been given a very rough "splatterdash" finish, and it has been beautified by potted ferns and palms.



A Unique Concrete Fence

"You'll Never Gain Anything by Carrying a Grouch"

Some Echoes of the Noon Hour—VII

By Edward H. Crussell

"BLISS," said the foreman one morning, as the two were walking over from the carline together; "I wish, if you see a good opportunity, you would drop a few words of advice in the ears of the Kid's brother."

"I don't think I get you," was the reply. "Why pick on me? What particular brand of advice do you think I have that he needs, and what has become of your own seemingly inexhaustable stock? Why can't you do this little job for yourself?"

"There's nothing wrong with my stock or my supply," said the foreman, "and I do hand him a little every chance I get, but I've been thinking that it would sink deeper and take better root, if it came from you, or one of the others. Like most young fellows, he seems to take anything coming from the foreman as being in the nature of a reproof; or perhaps thinks it a desire on the part of the latter, to speed up his efforts in the interest of the boss and is more likely to get sore at what is said, than he is to consider it as something to his own benefit. To the very young, too much advice from the foreman has the appearance of nagging."

"Well, I'll have to admit," remarked Bliss, "that it looks something like that to me. Why not leave him alone? Seemed to me that he was getting along alright; in fact, a great deal better than most of the young fellows you would be able to get in his place. What fault have you to find with him?"

"Not finding fault at all," explained the other patiently. "The trouble is, that you are not yet fully awake. The Kid's all right and, as you say, better than the average. Which is not the point. If he was the slowest and most useless kid that ever held up the other end of a board he'd still have a steady job with me, for more reasons than one. He's bright enough, and smart enough; I'm merely anxious that he shall get off to a good start and go as far as possible for the sake of his mother at home and his brother who has joined the colors. It was for that purpose I wanted your help."

"And when you put it that way," agreed Bliss, "there's never a doubt about you getting it."

Which, perhaps, explains why the noon hour discussions for the next few days all seemed to drift toward such themes as energy, accuracy, promptness, loyalty, honesty, speed, endurance, courtesy, and other desirable qualities on the part of the young.

Bliss made a start that very morning, while the Kid's brother was helping him to put up the cornice. The only way to get onto the scaffold was by climbing through one of the upper windows, and after the boy had been sent down, once for nails, and once more for a gage, he came back rather slowly and with an obvious grouch, so Bliss sent him down once more, just to show his authority. Upon his return he laughed him into good humor again and then gave him a little advice, the gist of which was: "You'll never gain anything by carrying a grouch, being sulky, or showing signs of weariness when asked to do something by those who are in authority over you. You have it to do, so you might just as well do it willingly, energetically, cheerfully, and get credit for it, as do it in the sulks and earn someone's disapproval. Your advancement will depend a great deal upon the help you get from the men with whom you are working, and you cannot expect these people to go out of their way to do a favor for someone who is doing his best to earn their dislike."

"All of that may be true," said the Kid, "but I'm not worrying much about learning this business; I'm not figuring on making this my life work."

"Well," replied Bliss evenly, "you'll find that what I have been telling you will apply to any walk of life, and the sooner you begin practicing, the sooner you'll get the habit. You're talking to a fellow that's been through the mill and knows something about it; if someone had told me of this when I was your age, it would have made my apprentice years much easier and I would have learned more. That is, always supposing, of course, I'd had sense enough to follow the advice. But it's the same old trouble; the young are never willing to start in where their elders leave off, they must always travel the entire distance for themselves. As a matter of fact, I suppose I received my share of advice and paid the usual amount of attention to it, though I do remember one piece that was handed to me by my old foreman. 'Harry,' said he, one day when we were by ourselves, 'if you follow the advice I'm going to give you, some day you'll grow up to be a man. Whenever there is something to be done, something to be moved or lifted, and it takes more than one man to do it, you be the first one to take hold of it, don't let anyone get ahead of you.'

"I thought at the time he was merely trying to get more work out of me, and no doubt he was, but he must also have been thinking of helping me, or he would never have bothered with me at all."

"I don't doubt there is a good deal in what you say," said the Kid, half jokingly, "but suppose you, with your present knowledge, had your life to live over again, what are some of the things you would do differently?"

"If I had my life to live over again," said Bliss, "I should begin differently and consequently would travel a different road, be as much at sea, and make just as bad a mess of it the second time as I did the first. However, my success in life, or lack of it, need not influence you one way or the other in considering my advice; a guide-post can quite successfully point out the way without traveling any part of that way itself.

"Here are some of the rules you ought to follow: Always get to work on time. Getting on the job early, or late, is merely a matter of habit, and the bad habits are the hardest to break.

"Be careful of material. A slovenly, careless workman can easily spoil more work than his wages amount to. It's not a nice thing for the boss to realize that he would have been money in pocket if he had paid you your wages to stay at home.

"Don't argue too much with the boss; he may have some inside information of which you know nothing. Even if he is wrong, it is seldom that he will thank you for forcing him to admit it.

"Execute distasteful orders willingly. If you are given a job you don't like, jump into it all the quicker and hammer

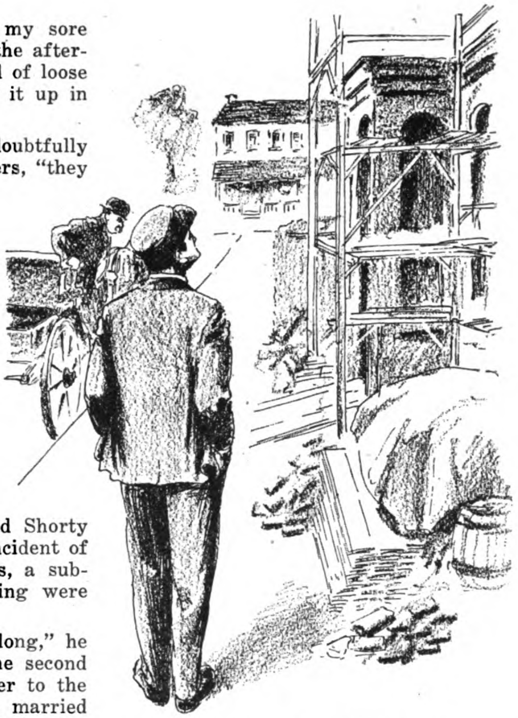
away at it all the harder so as to get done with it."

The noon whistle blew at this point and Bliss paused with a reminiscent smile. "I remember one time when that rule didn't work," he said as they desended to lunch. "I got a job with a street railway company building cars and the foreman set me to work scraping and sandpapering moldings. The moldings were of ash, and there was more fuzz and slivers to them than there was molding. I don't believe the knives on the sticker had been sharpened since it came from the factory. You've never done any of that kind of work, but anyone will tell you that it isn't a job to get jealous about. Thinking that perhaps they were trying me, to see what I was made of, I stuck it out for two weeks, and long before they were up most of the skin was worn off my fingers and where there was any skin left it was full of slivers. At the end I went to the foreman and asked him if he hadn't any other kind of work. 'Oh yes,' said he, 'we've got plenty of work.' So I told him I'd like a change. 'That's all the work I have for you at present,' was his reply, 'so I asked for my time. 'Oh well,' he comes back with, 'I was about to fire you anyway.' 'Yes, you pink-whiskered misfit,' said I, glancing at my bandaged fingers, and then looking him square in the eye, 'and I was about to pull your nose; I'd do it yet, if I didn't think it would hurt me more than it would you.'

"He must have telephoned about me to the office, 'cause when I got there they paid me off (two weeks' wages) in nickels and dimes. I insisted on breaking the rolls open and counting the contents before I would leave, and with my sore fingers, it took me the rest of the afternoon. I had all my pockets full of loose change and had to tie some of it up in a handkerchief."

"Gee!" considered the kid doubtfully as they sat down with the others, "they must have been paying you a fat salary."

"Well," explained Bliss, "my pockets, like yours, are generally full of some kind of junk or another, and thirty dollars, mostly nickels, makes quite a bundle."



"Gee, I Wish I Was Going to Work on That Job!"

Of course the other members of the gang wanted to know what Bliss had been talking about. He obliged with a recital, adding some further particulars concerning an argument he had with the clerk in the office, which caused Shorty to remember a pay-collecting incident of his own, in which two brothers, a subcontract and a Saturday evening were involved.

"I'd had my suspicions all along," he concluded, "so when it came the second week and no money, I goes over to the house (the elder brother was married and they both lived together) looking for what was coming to me. His wife said he was out, so I said I'd wait, and I did, from 3 o'clock in the afternoon until 11 o'clock at night, and neither prayers, tears, promises nor threats could move me. Finally the madam, after calling in a neighbor to watch me and the house, went out and dug up the coin. Whether she got it from the husband, or from a private supply, I neither knew nor cared."

"Where the Devil is That Carpenter?"

"I remember quitting a job under peculiar circumstances once," began Scotty. "In fact I quit two jobs in the same day. I was working, at the time, on a block of small dwellings, and every morning on my may to work used to pass a job in which I was much interested. It was a new church, with a heavy and complicated wooden roof, and I badly wanted to be in at the framing and erecting of it, to see how it was going to be done.

"One morning I saw a buggy in front of the church and surmising that it belonged to the boss contractor, I marched in, picked him out, and struck him for a job.

"'When can you start?' he asked. 'I'll be back with my tools in fifteen minutes,' said I, and at once set off for them. I was back within that time and was marching up the temporary stairway into the church, when he met me at the door.

"'Put your tools in the buggy,' he ordered, 'I have another job for you.'

"There was no help for it: I couldn't tell him I had just quit another job in order to work on the church, so I put my tools in the buggy and he drove me down to the lower end of town, where he wanted me to build a small cart shed, out of second-hand lumber. He gave me some very careful and thorough instructions and after telling me he'd have some more help on the job the next morning, got in the buggy and drove away. He was hardly around the corner before I had my tool box packed again and with it on my shoulder was beating it for the nearest car-line. I was back to my original job before the foreman—who was something of a sluggard—had shown up, and unless some of the other fellows told him, he never knew I had quit. I've never seen the other boss from that day to this, because after this incident, I picked out a different way to go to work and I never did see how they got the roof up. I've often wondered what he thought when he showed up with his extra help the following morning and found no one there to help."

"Huh!" said Shorty, with fine sarcasm, as the gang prepared for work, "he fell into a big streak of luck without knowing it."

(*To be continued*)

Department of Masonry Construction

CONCRETE, BRICK, ETC.

Practical Ideas Which Will Help You Do A Quicker and Better Job

How House Chimneys Should Be Constructed—Part II

Important Points in the Building of a Chimney Are Here Emphasized and Explained so as to be Readily Understandable

A Valuable Table Shows the Builder How to Proportion Flues for Warm Air, Hot Water and Steam Heating Apparatus

By Ernest Drah

A CARDINAL principle in flue construction is a smooth lining carried up as straight as possible, without bends, contractions or expansions of the area of any kind, so that a free passage to the flue gases may be assured. A good flue is more certain to be secured if it is lined with terra cotta laid up in cement mortar. Great care must be exercised to make certain that every joint is tight and that all spaces between the brickwork and the lining are filled with mortar. No cracked lining should be used. Plaster should never be used as a lining, because it is certain to fall off under the action of the gases and carry with it part of the mortar between the bricks of the chimney.

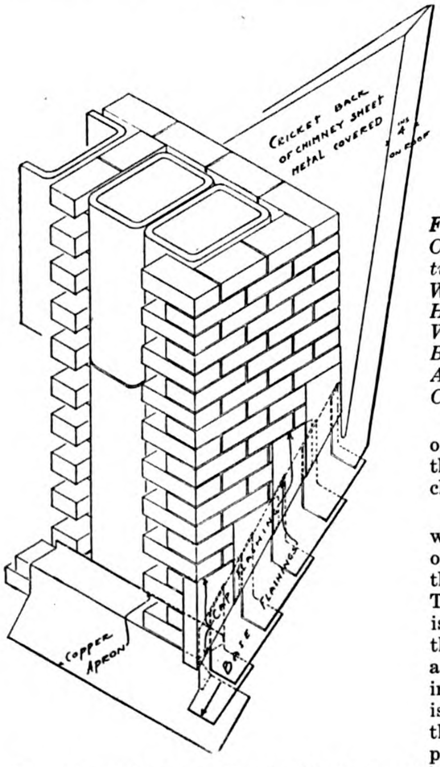


Fig. 12—A Chimney Can be Flashed and Counterflashed as Here Shown

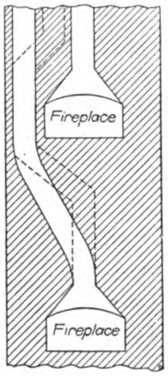
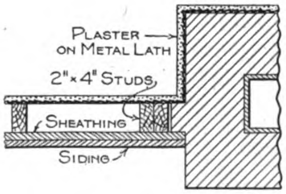


Fig. 11—A Flue Should be Carried Up as Straight as Possible, all Bends being Gradual as Shown by the Solid Lines. The Dotted Lines Show a Frequent Construction which is Faulty Because the Bends are Too Abrupt

Fig. 13—Construction Where House Wall Butts Against Chimney



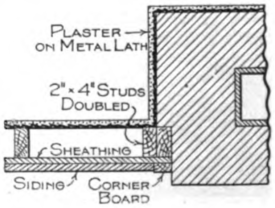
In the case of chimneys for stoves or where one fireplace is placed above another, it is sometimes necessary to bend the flues that are in the same chimney. The best construction for this purpose is shown in Fig. 11. The solid lines show the lower flue on a gradual incline with a straight rise from the fireplace several inches high, before being bent over. It is better to make the bends round rather than with sharp angles. A frequent, but poor construction is shown by the dotted lines, which is faulty because there are entirely too many abrupt bends for efficiency. Besides impairing the draft, these bends will collect soot and thus cause trouble. The idea that every flue should have one bend in it to prevent rain from striking down into the fire is a fallacy.

A round flue gives best results because smoke rises in a spiral column, and there is less opportunity for down-draft in a round flue. If a round flue is not used, preference should be given in the order enumerated to octagonal, hexagonal and square-shaped flues. Long, narrow flues have demonstrated their inefficiency, as they have a large area of wall surface exposed to the outdoor temperature and are sure to cool the gases and interfere with the up draft. The shape presents more friction, and such flues have less capacity than round or square flues of the same area.

Round and other shaped flue tiles are not interchangeable as regards size, about 9/10 the diameter of a round flue being equal to one side of a square flue of the same capacity. If a square flue of a given area is specified and a round one is substituted, there is liable to be trouble, for it can be easily seen that putting a round flue into the space left for a square one will result in less flue area.

To avoid deception as to size, it should be remembered that square and other rectangular shaped flues are listed by outside measurement and round flues by inside measurement. For instance, an 8½ x 13 in. flue lining instead of having the 110 sq. in. area of a brick built

Fig. 14—A Variation of the Construction Shown in Fig. 13



flue, has an inside measurement giving a cross sectional area of but 79 sq. in. The thickness of round flue lining varies according to the size of the lining from 15/16 in. for a 7 in. lining to 1¼ in. for an 18 in. lining. Square flue linings vary from 21/32 in. for an 8½ x 8½ in. lining to 1 in. for an 18 x 18 in. lining, and can be had with either round or square edges.

In general, the estimating of the size of flue is difficult, for height of flue, kind of fuel, whether the chimney is an inside or an outside one, and many other considerations enter into the computation. If wood or soft coal is used as a fuel, the flue should be about 25 per cent larger than if hard or anthracite coal is used.

A stove flue should be at least 8 x 8 in. and, if the stove is large, an 8 x 12 in. flue should be used. For warm air furnaces, the flue should be 8 x 12 in., and if the house is large a 12 x 16 in. would be necessary. For a fireplace, at least an 8 x 12 in. flue is necessary. These are inside measurements, and are only rough approximations. For accuracy the table given further on should be consulted.

Every heating contractor and most builders know that the efficiency of any heating apparatus is absolutely dependent upon a proper size flue, as the heating apparatus is kept burning by the draft action of the chimney, and the intensity of the draft depends on the height of this chimney flue. Besides height, a chimney must be of sufficient cross sectional area to carry off the smoke and waste gases—and no flue will work properly unless its cross sectional dimensions are the same from the starting point to its termination in a coping, or chimney cap at the top. With these proportions planned properly to suit the conditions, the result will be economy in the operation of the heating system.

The following is an original table of flue sizes for warm air furnaces, steam and hot water heating, which was prepared especially for this article by M. W. Ehrlich, member American Society of Heating and Ventilating Engineers, and is given as an aid in selecting the proper size flue for different conditions. It is based on practical experience and observations on many house heating systems. The chimney heights referred to correspond to a measurement from the grate in the heater to the very top of the chimney above the roof.

The design may be such that a brick flue will be used; in another case a round metal stack or circular fire clay flue lining may be preferred. The tabulation covers these and other construction features, giving the corresponding sizes of commercial flues for round pipe, unlined brick and rectangular fire clay flue lining. The figures are arranged for steam, hot water and furnace heating systems corresponding to three chimney heights that come within the limits of many types of residences and small commercial buildings.

In order to make use of the practical values in this table, the contracting builder or architect must first determine or obtain from the heating man the figure that will show the tax on the system. Steam and hot water heating plants are specified by the number of square feet of direct radiation to be installed. If there are indirect or direct-indirect radiators in the building and any exposed piping, these surfaces must all be added to obtain the total equivalent in direct radiation. For warm air furnace systems, the only reliable method is to add the cross sectional area of all the warm air leaders or pipes in the basement. This will give the tax on the system in terms of square inches of warm air pipe area.

How to use this table and apply the figures in practice is explained in the following examples.

Say a house is heated by steam. The height from the grate level of the boiler to the top of the chimney about 3 ft. above the highest point on the roof is 25 ft. The system has a round total of 1190 sq. ft. direct steam radiation.

To find the size of flue, refer to the table under the head 25 ft. high and read down in the column marked "steam" to the nearest figure corresponding to 1190 sq. ft. It will be noted that 1260 is the nearest value. From this point read across to the left to the type of flue required and then find the dimensions necessary for the conditions. If a round flue is to be used, a 15-in. pipe will be required for this condition; if a rectangular flue lining is to be installed, then an 18 x 18-in. will be required as stated by the table, because it is the nearest commercial size tile that has at least the required cross section area.

If the flue area for a hot water heating system with 980 sq. ft. of direct radiation is to be figured, the chimney height being 38 ft., consult the column headed "35 ft. high," which is the nearest height to 38 ft. Glance down to the first number greater than 980 in the column "hot water," which is 1130. Reading over to the columns of flue sizes we find that a 12-in. round flue lining, a 13 x 13-in. tile flue lining, or an 8 x 13-in. brick flue unlined will be necessary.

TABLE OF CHIMNEY FLUE SIZES FOR HOUSE HEATING SYSTEMS

By M. William Ehrlich

COMMERCIAL FLUE DIMENSIONS			25 FT. HIGH			35 FT. HIGH			45 FT. HIGH		
Round Flue (inside dimensions)	Brick Flue Unlined	Tile Flue Lining (outside dimensions)	Steam	Hot Water	Furnace	Steam	Hot Water	Furnace	Steam	Hot Water	Furnace
7	8x 8	8½x 8½	190	280	215	230	340	240	270	390	260
8	8x 8	8½x 8½	270	400	310	325	490	350	380	570	370
9	8x 8	8½x13	370	550	425	460	660	470	510	770	500
10	8x12	8½x13	480	720	550	580	870	620	670	1000	660
12	8x12	13 x13	750	1130	870	900	1350	960	1050	1580	1040
15	12x16	13 x18	1260	1900	1480	1530	2300	1640	1790	2680	1780
18	16x16	18 x18	1940	2950	2230	2330	3490	2490	2700	4060	2690

Note—Steam systems listed in sq. ft. of direct radiation. Hot water systems listed in sq. ft. of direct radiation. Furnace systems listed in sq. in. of warm air pipe area.

If the system is to be a warm air furnace, it would first be necessary to figure in square inches the amount of warm pipe area. Suppose this were 630 sq. in., the chimney height being 45 ft. The nearest number greater than 630 in the column headed "furnace" and "45 ft. high" is 660. Reading across gives the flue sizes required.

Fig. 15—A Chimney is Often Built of Stone Above the Roof and of Brick Below, as Here Shown

A separate flue should always be used for each piece of apparatus, because there is risk of impairing the service of the equipment when two or more are connected with the same flue. If the draft of either apparatus is checked by admitting air, it will check both fires, as the air that enters through the opening will supply the draft of the chimney and prevent its force being exerted on the fire. There is also danger from fire, as sparks are likely to come down through the unused flue.

There is always a certain amount of air going up a well-constructed flue even if no fire is lighted. When the cold air comes up the unused flue and strikes the warm air from the used flue, it cools the warm air and destroys much of its

velocity. The down draft, which is present to a certain extent, and often cross drafts and every other kind of draft known, all join together to force the smoke somewhere where it is not wanted, for the more openings there are into one flue, the more the air supply is distributed and the greater the chance for cross currents and down drafts. The used or the unused flue may be the one to smoke, but the smoke will come down somewhere where it is not wanted and carry with it its cooled sediment to be deposited in the form of soot.

In order to show more clearly the necessity for separate flues, suppose that we have a fireplace needing an 8 x 12-in. flue. Now suppose that this flue is connected with a stove flue which needs an 8 x 8-in. flue. When both fireplace and stove are lit, a 12 x 16-in. flue might work under favorable conditions. But suppose that only the fireplace is lighted. Then too much of the heat will go up the chimney because the flue is too large. If the stove alone is lighted, the effect will be worse. No flue between an 8 x 8 and an 8 x 12-in. would work to the best advantage for either fireplace or stove alone, because it would be too big for the one and too small for the other, and, in addition, it would probably not prove satisfactory to use both the fireplace and the stove at the same time. There is also another consideration to be taken into account, for cross currents of air occur when one flue is used for two or more fireplaces and these tend to reduce the efficiency of the flue. However, the vagaries of chimneys are somewhat of an uncertain factor, and the particular conditions of a job may cause the installation to work satisfactorily even though this advice is disregarded. But one flue to one heating apparatus is the best practice and results in the most economical operation.

One of the most vital parts of a chimney as regards leaks is where it passes through the roof. Here it should be well flashed with heavy tin, copper, or sheet lead extending at least 3 in. above the roof covering. The flashing should be carried in between the bricks of the chimney and allowance made for expansion or contraction of the metal by an accordion-like fold. Or, better still, it can be flashed and counter-flashed as shown in Fig. 12, which will readily enable the chimney to be built clear of the roof boards. A cricket or saddle should be built in back to shed rain and snow, as shown, and covered with sheet metal. This saddle keeps the snow or rain from collecting in between the back of the chimney and the roof, with resultant leaks.

Framing timbers should not be closer to a chimney than 2 in. and metal lath should be used near a chimney if it is necessary to fur out. In order to support the metal lath, it is advisable to embed metal loops in the chimney as it is being built. Nails should not be driven into a chimney which is less than 8 in. thick, as they would tend to crack it and cause leaks.

Wall paper should never be put directly on a chimney breast, for there is liable to be a condensation of the moisture which will spoil the paper. In such a case, it is necessary to use metal furring to keep the paper away from the chimney.

If any portions of a chimney are to be encased in woodwork, the masonry should receive a coat of cement plaster, and the woodwork placed against this plaster should be separated from it by a sheet of asbestos board at least ⅛ in. thick.

Wood beams especially should not be rested on a chimney, although this is often done and forms a frequent cause of fires. Beams near a chimney should be flashed with tin. When expense is not an important factor the space between the timbers and chimney brickwork may be filled in with mineral wool or other incombustible material packed in on top of sheet metal flashing turned into the brickwork and fastened to the beam.

A chimney should stand clear of all timbers. In order to prevent the resulting continuous dead air space from acting as a flue in case of fire, each floor level should be stopped off by a fire stop consisting of mineral wool packed in on top of copper fastened to the timbers and let into the brickwork.

Where the clapboards of the house wall abut against the chimney the junction can be made as shown in either Fig. 13 or Fig. 14, the former being the better, although the more expensive method. The sheathing and clapboards are bedded against the chimney in cement. In a stucco house, space of about ⅛ in. can be left between an outside chimney and the sheathing, and the stucco forced into this so as to give a good clinch.

An interior chimney often has the part built above the roof constructed of field or cobblestone, the portions concealed by the house being of brick. This construction is shown in Fig. 15, which also shows the flue lining projecting above the chimney and the cement cap sloping away from it of an angle of about 40 degrees.

How Concrete Can Be Made Waterproof

MANY methods and ingredients have been devised for making concrete completely waterproof. In many kinds of stucco work and in concrete that need not be impervious to ordinary dampness some of these are applied to walls after they are finished. In others the waterproofing is made a part of the concrete mixture, this latter being known among masons as the integral process. About 2 per cent of the materials used in integral waterproofing is customarily added.

The purpose of the integral addition is to supply a filler even finer than the cement which shall close the most minute parts left between the sand grains and the cement. Alum and lime are sometimes used, as are diluted soap and emulsions of oil. Soap in the water, with which cement is mixed, and alum in the concrete mixture, are supposed to act chemically upon each other and produce a totally non-porous substance. There are many integral compounds, manufactured under trade names, most of which are relied upon by masons for ordinary work.

But for cisterns, retaining walls that must withstand long and steady soaking, and floors subjected to frequent floodings no process has been found as efficacious as the application of waterproofing on the side that is subjected to the water. Of these the most satisfactory and the cheapest, where the character of the work permits of its use, is asphaltum, either as a dissolved paint or heated and applied while liquid. This may be applied with a brush, allowed to soak in, and repeated coats added till the workman is sure every pore is closed.

Another process depends upon paraffin to close all pores against moisture. The application of paraffin is a more complicated and expensive process and is not considered more effective than the asphaltum coating. It has the advantage, however, that it may be applied to stucco or other exposed surfaces without marring their appearance, and paraffin-finished walls may be painted any color desired with specially prepared paints.

In applying paraffin the surface to be covered is gone over with a gasoline torch and heated, a small area at a time, and the paraffin at high temperature blown on in a spray. The heated wall draws the liquid paraffin into every pore, and when the work is finished the surface is covered with a film of wax. Paraffin is sometimes dissolved in benzine or some other solvent and applied like paint. When this method is used several coats must be applied, each being allowed ample time to dry out.

The chemical affinity of soap and alum is the basis for another waterproofing method. Soap, preferably an olive oil

or castile soap, is dissolved in hot water at the rate of four pounds to five gallons. Ten ounces of alum is dissolved in five gallons of water in another vessel. First the soapy water, at a temperature as near boiling as can be maintained, is brushed over the wall, and it should be brushed in till a smooth, unbroken surface is secured. After the soap has thoroughly dried, in from one to two days, a coating of the alum water is applied and allowed to dry. Another coat of soap and a second coat of alum finishes the job. In a short time it will be found that chemical action has amalgamated the soap and alum into a coating that thoroughly withstands water.

It will readily be seen that these processes are expensive, even the asphaltum costing from 40 to 50 cents a square yard. Hence, the builder will do well to see that his concrete is made rich enough with cement and is sufficiently firm, so that his wall will require no further waterproofing.

Many workers in cement, particularly plasterers putting up stucco or applying finishing coats to concrete walls, use lime in their plaster. An addition of lime makes the mortar more smooth and putty-like and much easier to handle, straight cement mortar being short and inclined to be crumbly. The best authorities agree that a small admixture of well-seasoned hydrated lime does not harm cement mortar if it is thoroughly incorporated. But the danger in ordinary practice is that the lime will be allowed to run through the mortar in lumps. A lump of lime, even though it be no larger than a pinhead, will absorb water, while the surrounding cement remains dry.

Freezing weather is likely to expand the moisture in the lime and cause it to spoil the surface of the work. Sometimes a job that is perfectly smooth in the fall will be pockmarked and pitted after a winter's freezing as though it had been shot with tiny steel bullets.—*New York Times.*

Building Concrete Walls on the Farm

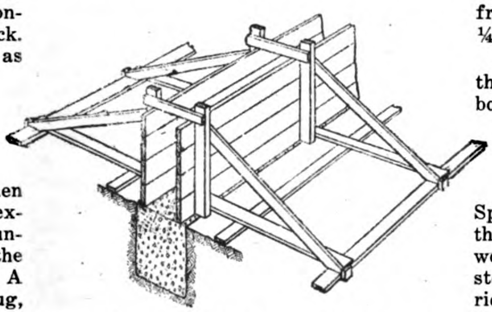
CONCRETE walls are especially suitable for farm entrances or enclosures about farm buildings. Where merely serving the purpose of an enclosure, such as a barnyard or poultry yard, it is not necessary to construct the wall more than 6 in. thick. Simple methods of construction are as follows:

The most important consideration in the construction of any wall is a firm foundation, sufficiently deep to prevent heaving by frost. In most localities this distance is 3 to 4 ft. When the earth is firm and the sides of an excavation will stand up vertically, it is unnecessary to use wooden forms for the portion of wall beneath ground level. A trench of the required width is dug, taking care that the sides of the trench are straight, vertical and fairly smooth. The width of all walls below ground level should be at least 12 in.

Where sandy or crumbly earth is encountered, it is best to use wooden forms below ground level. In depositing the concrete in the foundation trench see that no dirt falls into it, as this would weaken the wall.

The proper proportions for concrete in walls below ground are 1 bag of Portland cement to 2½ cu. ft. of sand to 5 cu. ft. of crushed rock or pebbles.

When the trench is filled with concrete to ground level, a simple form, such as shown in illustration, is set in place. The surface of the foundation at ground level must be entirely free from dirt, chips or other foreign substances and the concrete roughened before depositing upon it the above-ground portion or wall proper.



A Type of Form Which Can be Used for Building Concrete Walls

The minimum thickness of walls for very light structures may be 4 in., although it is very difficult to deposit concrete in a wall this thin. A thickness of 6 in. is better for most purposes.

The proportion of concrete for walls above ground should be 1 bag of Portland cement to 2 cu. ft. of sand to 4 cu. ft. of crushed rock or pebbles. Bank-run gravel may be used if the pebbles are separated from the sand by screening through a ¼-in. screen.

For the above-ground portion of walls the forms should be made with care, the boards being carefully matched so that a smooth surface will be obtained in the finished wall. This result is obtained by spading the concrete, as it is being placed in the forms. Spading consists of thrusting between the form and the fresh concrete a thin wooden paddle. This serves to force the stone back into the concrete, allowing a rich mortar coat to flow against the forms.

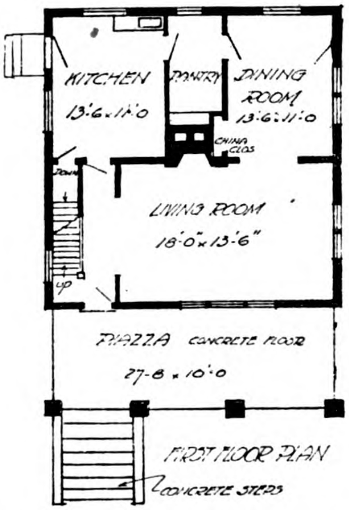
In walls above ground it is well to reinforce the concrete with small steel rods or wire mesh. This reinforceing runs in both directions and serves to prevent any cracks due to settlement or other causes.

Walls for small buildings around the farm can be constructed as described but for buildings of considerable size the thickness of the walls should be 8 in. and one or two lengths of reinforcing rods should be laid about 2 in. above the tops of windows, doors and other openings.

Constructing the Back Plastered Stucco House

IT is easy to design an expensive house and make it fire and waterproof, when the owner has plenty of money so he can put in everything desired. But to design and build a house that is modern and has up-to-date improvements, that is substantial and looks well, and keep the price down where the public can buy or rent, is ten times the job at present. It is out of the question to think of making them strictly fireproof, unless built on a very large scale.

We have worked the problem out in this way: The sills and frame are the same as for a wooden house; the studding is 2 by 4, set 16 in. o. c. and bridged half way up on each story. Then the studding is painted on the outside with asphalt roofing paint; next we cover the studding with heavy ribbed metal lath, stapled on with heavy fence staples, at least 4 staples to each stud for every sheet. The ribs are put next to the studding, so that the mortar will have a chance to grip. This will make the frame as rigid as if boarded. We next put on the roof; no finish is used except to cut 6-in. boards between the rafters, which are planed at the bottom end, and a 6-in. facia board nailed to the ends of the rafters. The matched roof boards are put planed side down over the cornice, and the rest of the roof is covered with square edged boards.



The roof covering is slate surfaced asphalt roll roofing, which makes a good roof at low cost.

The walls are plastered three coats on the outside with cement plaster, with 10 per cent hydrated lime added; the dash is of white cement.

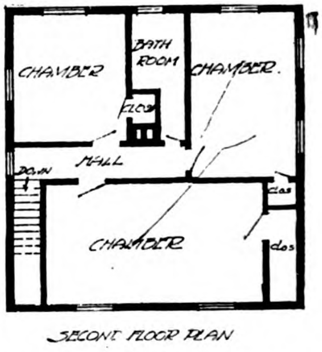
The inside is back plastered between the studding, about ½ in. thick, making a wall 1½ in. thick, with no boards to shrink and swell to crack the concrete. After the inside back plaster is dry we paint it all over with asphalt roof paint, and no dampness can possibly get through.

The front and back porch floors and steps are of concrete; the front porch columns are plastered the same as the house.

Inside the house the walls are plastered with hard plaster on plaster board, which makes the walls practically fireproof; the plaster board is no cheaper than lath, but is better. The finish is yellow pine stained; the floors are beech and hard pine. The houses have modern plumbing, electric lights and furnace heat.

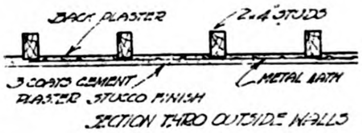
The cost of the house illustrated in the winter of 1916-1917, cellar and all complete, was $2,300. One like it now building will cost $2,500.

The cost of the cellar for this house is about $200. Most cellars are stone, as there are plenty of them in this locality.



The cost of putting on the metal lath is about 15 cents per yd. The cost of the 4 coats of plaster is about 90 cents per yd.

The concrete steps are made by using our own patent steel forms, and we find that plain steps like these can be put in at a good profit at from 59 cents to 60 cents per ft. of step.



The plumbing cost $180. The furnace cost $100.—H. L. Park in *Concrete*.

Laying Concrete at a Temperature 15 Degrees Below Zero

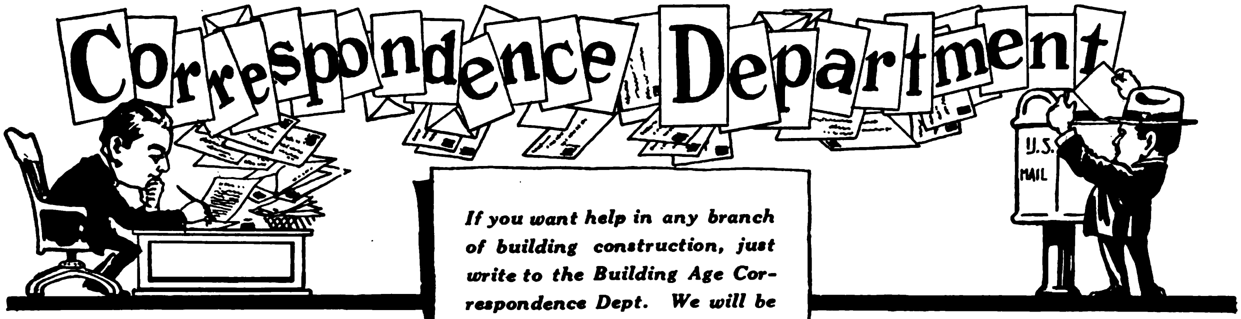
A SMALL building job that presented unusually difficult conditions on account of a time limit during very low winter temperature accompanied by the heaviest snowfall and the most severe blizzards in the city's history has just been completed within the time limit in Chicago by the A. Lund Construction Co.

Work proceeded with only a few hours' interruptions, notwithstanding that temperatures ranging to 14 degrees below zero prevailed and during the early part of the construction there was the heaviest fall of snow on record with practically all streets blocked to traffic except those on which were street car lines.

The foundation work consisted of side retaining walls on three sides and a central row of piers. Forms were constructed in the usual manner.

About a foot inside of the forms for the sidewalls and about the same distance entirely surrounding the central piers other forms were built. Before the concrete was poured the space between the two sets of forms was filled with stable manure and firmly tamped.

The concrete was mixed in a 15 cu. ft. "Standard" low charging mixer which was placed close to the side of the structure, making it necessary to wheel the concrete only a short distance. Sand and stone were delivered by teams and motor trucks and the sand piled and heated by maintaining a fire in a central cylinder of boiler iron extending through the pile. Water for the concrete was supplied by a large cask mounted on the mixer platform, and heated by a vertical type boiler placed near the end of the mixer. The stone was not heated and no anti-freezing preparations were used. As soon as a section of a sidewall or one of the piers was poured the top was covered with stable manure about a foot deep and allowed to remain until it was necessary to remove it to begin the brick superstructure.



If you want help in any branch of building construction, just write to the Building Age Correspondence Dept. We will be glad to answer all your questions without charge.

Questions should be confined to construction only, as the editors cannot undertake to design structures.

All readers are invited to discuss the questions and answers published.

GOTHIC ROOF FOR BARN

From John Upton, La Fargeville, N. Y.—In the August issue of the paper "C. E. K." of Fiske, Canada, makes inquiry about different methods of constructing a Gothic roof for barns and an explanation of the easiest way to obtain the bevel for the cut of the rafters on a gambrel roof where the two rafters—the upper and the lower—meet.

In reply I would say that rafters for Gothic or curved roofs can be made from plank sawed to the proper curve and put together so as to use four thicknesses, or they can be made from four thicknesses of 1 x 4-in. stuff flatwise, bent to the right curve and nailed. For this method it will be necessary to place posts in the ground to hold the boards while they are nailed together or blocks could be fastened to the barn floor to serve the purpose as only a single rafter is in the "form" at a time for nailing and is then taken out and laid aside while another is made.

The curve can be laid out on the floor or level ground by using a line for the radius which is equal to more than one-half the width of the barn. About three-quarters the width will be found to be right.

Another way to make the roof is to get out enough rafters of double plank so as to place them every 6 ft., then put purlins between them some 6 ft. apart and down 2 in. from the top edge of these truss rafters. The two rafters between each two trusses are made of 1 x 4's put on flat. These will curve to match the trusses and come up even with them.

Which is the better way will depend on local conditions, material, etc., and what means one has for preparing the work. The trusses, whether 2 ft. apart or 6 ft. apart, are built on the floor of the loft, fastened together and raised with block and tackle. A gin pole is needed for the first one and the last ones will need to be raised and then moved out into place.

The matter of obtaining cuts for the top and bottom of the curved or Gothic rafters may seem a difficult operation, but if one will take a board (or two boards spliced together) and make a pattern for a straight rafter to set on the plate and to be the same height that the curved rafter is to come, this pattern can be used for marking the curved rafters just the same as though they were straight.

The same idea may be used for obtaining the top and bottom or plumb cuts for the gambrel rafters, since those lines must come horizontal and vertical no matter what shape may be the rafter. As to the cuts where the two gambrel rafters join, if the reader will look at the drawing on page 453 of the August issue, it will give him an idea. Another way often used in actual work is to lay two boards down in the position they are to occupy—that is, lapping one on the other at the proper angle—marking across from edge to edge at the angles formed. The way to mark them with a square is to make a draft of the two rafters, each in its proper position, bisect the angle formed and apply the square to this to obtain the figures.

THE SIZE OF SEPTIC TANK NEEDED

From J. V., New York.—In reply to M. F. L., of Texas, who asks information regarding a septic tank, experience seems to prove the advisability of building a septic tank with a capacity sufficient to handle a 24 hours flow of sewage or wastes from the average home. Usually capacity is estimated by considering that the discharges into the tank will range from 30 to 50 gallons for each person per day, which is more practical than estimating from the number of fixtures used.

The length of the tank should be twice its width, so that it will be possible to obtain a uniform velocity of flow through it. This will prevent any great disturbance of the scum. The depth should be not less than four feet below the opening of the pipe which discharges wastes into the tank. The total depth of fluids in the first compartment should be about five feet or even greater. Baffle boards are used to prevent any of the scum from being carried over into the siphon chamber. After remaining in the first chamber a sufficient length of time, the solid matter which the wastes contained has been destroyed and the liquids overflow into the siphon chamber.

Two methods may be used to care for discharges from the siphon chamber, resulting from the frequent emptying of this compartment by the automatic siphon. If a certain space can be set aside for the purpose, broad irrigation is a good means of disposing of the discharges. This allows the liquids discharged by the tile line from the siphon compartment to flow over the land, while in the final disposal by broad irrigation it should be the aim to select an area where wastes will not be washed immediately into some nearby stream, thus fouling the water.

If tile is used it should be non-porous, laid with cemented joints. The outlet should discharge into an open ditch which may be 12 inches wide by 6 inches deep with side ditches connecting to the main one at right angles and about six feet apart. The fluids should easily spread over the given area.

In the subsurface irrigation method the contents of the siphon compartment are discharged into lines of four-inch drain tile laid with open joints so the liquid will leak out and filter into the ground. The grade should be two inches per hundred feet. To prevent dirt entering cover joints with pieces of stones. Connections between the house and septic tank should be made with tight joints, always.

WHAT I THINK OF BUILDING AGE

From Andrew P. Gladden, Contractor and Builder, Chester, Pa.—For many years I was a subscriber to the paper when it was known as *Carpentry and Building* and am free to say that I am very fond of BUILDING AGE. It is one of five papers that I take and I consider it the most up-to-date journal that comes to my office. I am a graduate architect—carpenter by apprenticeship—and contractor of the best buildings in this section.

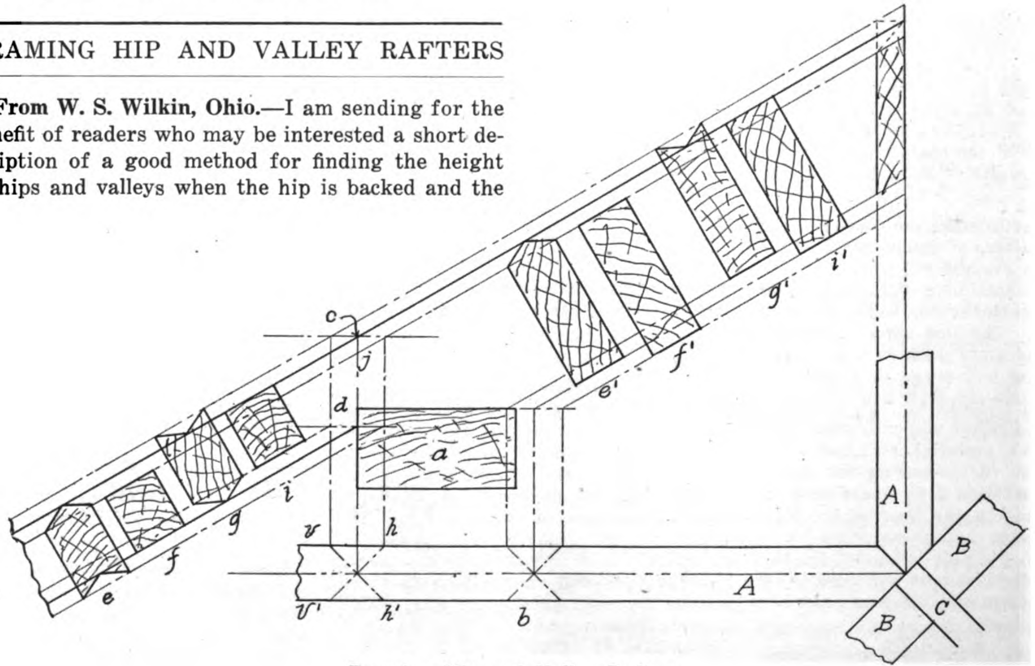
A LETTER OF APPRECIATION

From Edward H. Crussell, Sacramento. Cal.—The February issue of the BUILDING AGE, which has just come to hand, contains an announcement I am very sorry to see. I refer to the paragraph which calls attention to the resignation of the editor, Mr. Henry Colwell. My files of the paper go back to the year 1892; since that time I have been reader, correspondent and contributor. I have never met Mr. Colwell, but hundreds of letters have passed between us, and I am perfectly qualified to testify to the "kindly sympathetic personality" mentioned in the paragraph. No matter whether the letter was a request for a favor, an excuse for work promised and not performed, or a blunt unfavorable criticism of work published, the reply was invariably prompt, kindly, and courteous. The favor was always granted, the excuse always accepted, and the thing criticised carefully explained.

The first of my writings that ever saw print were letters sent to the correspondence pages of CARPENTRY AND BUILDING, and to the friendly encouragement and suggestions received from Mr. Colwell at that time, more than any other thing, I feel I owe what small success I may have attained to as a technical writer. Editors have plenty to do without assisting embryo writers, and I am convinced that if my first efforts had been submitted to some other editor, very few of my ideas would have littered up the printed page. I could not let Mr. Colwell's resignation pass without making a feeble effort to voice my indebtedness and appreciation.

FRAMING HIP AND VALLEY RAFTERS

From W. S. Wilkin, Ohio.—I am sending for the benefit of readers who may be interested a short description of a good method for finding the height of hips and valleys when the hip is backed and the valley grooved or when they are left plain. Referring to the sketches, *A-A* represent the plan of the hips and *B-B* the common rafters, with *C* the ridge.



Framing Hip and Valley Rafters

Draw the lines *v'h* and *v-h'* at an angle of 45 deg. The part from *v* to the center and out to *v'* represents a valley and *h-h'* a hip. At *a* is represented a section of the plate at the corner of the building. The distance from *a* to *c* must be the same as the height of the common rafter over the outside edge of the plate.

I am not saying whether the rafter should or should not be backed, but I am just showing how to work it in either case. Draw a horizontal line through *c;* also the pitch line of the rafter passing through *c*. The plumb lines from *v* and *h* will give the other two lines.

If the valley is to be grooved, it is raised as shown at *g'* so that the ends of the sheathing come on the line *c*. If it is to be left flat on top it must be set as at *i'*.

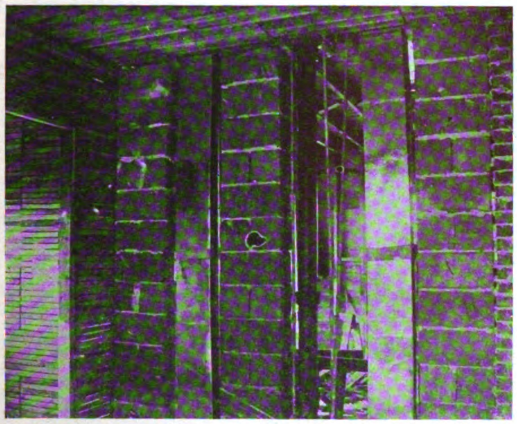
If the hip is to be backed it is made as shown at *e'* so that the sheathing will come together on the line *c*. If the hip is to be left flat on top it must be lowered as at *f'* so that the sheathing will strike the edge of the hip and come together on the line *c*.

If the planceer is to be nailed directly to the underside of the rafters the hip or valley must be cut down to correspond to the common rafters. The manner in which the lower ends must be cut, according to whether they are backed or left plain, is shown at *e-f-g-i*. There may not be many carpenters who will back the hips, but it will be seen by the drawing that every carpenter should know how to find the backing and the difference it makes in setting hips and valleys. The pitch of the roof determines the amount of backing it will take and the carpenter must find the backing in order to know how much to lower the hip if it is not backed, as from *c* to *j*.

ECONOMIZING IN BUILDING CONSTRUCTION

From J. F. H., Indianapolis, Ind.—It is the proper thing to cut down building cost wherever it can be done without a sacrifice of safety, comfort or convenience, but there is such a thing as carrying the cutting business too far.

The accompanying picture shows where, in the writer's estimation, cutting-down economy has been carried altogether too far. The kitchen portion of a double house is shown by the engraving and there is supposed to be a concrete block wall, 8 in. thick, between the two parts of the house, but from the chimney visible at the extreme right to the porch pantry behind the lathing at the left, a distance of about 7 ft. 6 in., there are only three piers 16 in. wide, the rest of the space being openings for hot and cold water pipes, soil and vent pipes and the tin hot-air conduits for heating the rooms upstairs from furnace in the cellar.


Carrying Economy Too Far

The hot-air conduits are about 4 in. by 10 in. and pass in pairs which do not show very plainly in the picture. There are four furnace pipes and four water pipes, but only one soil pipe for the two tenements. Connections at the top for upstairs are plainly visible on the far side of the cast iron pipe at its top, and at the bottom, in front, is shown the capped connection for the future kitchen sink of the near tenement.

There are so many things against an arrangement of this kind and so very few in its favor that one scarcely knows where to begin a description of them. But about the only points in favor of the scheme that I can find are those of cheapness and convenience. There is no wall which costs as little as no wall, and with the many generous openings it is easy to install the various lines of piping.

One argument against this arrangement is the mutilation of the dividing wall, supposedly fireproof to a certain extent. In other structures the furnace pipes are separated so that each passes through a cut of its own in the concrete wall and does not remove more than two-thirds of the concrete wall thickness. The second objection to running furnace pipes in this manner is the great loss of heat into the pipe with which one of the conduits may be paired. In this case, heat is supplied by separate furnaces, operated by different parties, and the man on one side of the wall, if he has no fire in his furnace, or has that pipe disconnected, can steal nearly half the heat his neighbor sends through the opposing pipe—a plain case of "induction," as the electrician would call it; the heating engineer calls it "conduction," but in reality it is "abstraction."

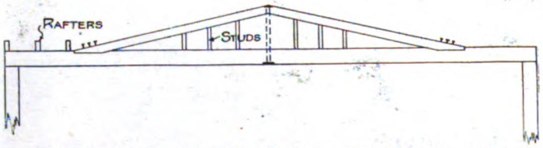
The third defect is in the running of the hot and cold water pipes in close proximity to each other, as the water will be almost as hot in the cold water pipe as in the other and a whole lot of water must be drawn and wasted before real hot or very cold water can be obtained.

A fourth defect is in two separate establishments being attached and connected to a single soil and vent pipe with its attendant unsanitary conditions and limitations.

The fifth, and perhaps the greatest objection of all, lies in the fact that water, heat and soil pipes have no business in a common or middle wall between two separate living apartments. Placing these vital arteries thus makes it necessary to put the bath, the wash bowl and the kitchen sink each and all against the party wall, where they are never within reach of direct air and sunlight—where the toilet and bath must either be located in inner rooms, or, if located outside, a long, nearly level soil pipe and waste connection must be placed between floor and ceiling, to be forever giving trouble through its lack of proper pitch to carry away its contents when bath or toilet are in use.

SUPPORTING A PORCH ROOF OF 28-FOOT SPAN

From Builder, Redford, N. Y.—The first thing "F. W." of Pittsfield, Mass., requires for his porch is a 6 x 10 in. hardwood timber or long-leaf pine and two pieces 6 x 6 in. by 14 ft. for the trusses. He should put a pediment on his porch and build it on his truss as shown in the accompanying sketch. As his porch is 8 ft. wide, he will likely have 30 in. rise above the plate, which would give him 30 in. from the top of the plate to the top of the truss. The pediment may be finished to accord with his house and he may vary the truss according to the pitch of his porch. The toes of the trusses should not be more than 4 ft. from the post. By making the pediment flatter than porch roof the trusses may be nearer post.



How to Support a Porch Roof of 28 Foot Span

A Dutch Colonial House Built in Connecticut

SEVERAL interesting features are contained in the plan of the residence of Jacob Keeling. One of these is the arrangement of the vestibule and hall, sliding doors dividing this section from the dining room and living room. The arrangement of the dining room, pantry and kitchen is interesting, as the plan renders it impossible for anyone in the dining room to see into the kitchen. The icebox opens into the pantry, and can be filled from outside. The kitchen sink is placed underneath a window, and the stove is so placed that the housewife will not stand in her own light when working at the stove. A careful study of the plan will show several other interesting features of this nature.

The plumbing of the house is concentrated, the bathroom on the second story being placed over the kitchen and an extra toilet under the first story stairs, this arrangement affording economy of piping.

The arrangement of the cellar stairs is also a bit out of the ordinary.

The foundation walls are constructed of local stone, selected fieldstone being used above grade.

The framing timbers are of spruce, the sizes of the principal members being as follows: Girders 6 x 10 in., sills 4 x 6 in., first and second floor joists 2 x 6 and 2 x 10 in. placed 16 in. on centers, main rafters 2 x 8 in. placed 2 ft. on centers, outside studs 2 x 4 in. placed 16 in. on centers, inside studs 2 x 3 in. placed 16 in. on centers.

The building is sheathed with North Carolina pine roofers, which were covered with Neponset black building paper, and finished with 24 in. Creo-Dipt stained shingles, Dixie white, random widths. The exterior trim is of white pine and cypress. The roof was boarded with ⅞ x 4 in. No. 3 hemlock strips and then covered with 18 in. No. 1 red cedar "Perfection" Creo-Dipt green stained shingles.

The roof over the entrance porch and veranda is covered with Paradox roofing.

The house is plastered throughout, wood lath being used.

Floors are doubled throughout, clear quartered white oak flooring being used for the finish floor throughout the first story and the bathroom in the second story. The remainder of the second story has finished floors of North Carolina pine. Sixteen-oz. felt was placed between the rough and finished floors.

The trim for the main part of the building is of Arkansas Soft Pine, enameled white. The kitchen trim is of North Carolina pine, stained natural.

Showing the Attractive Appearance of the Back of the House

The Back of the House, Showing the Kitchen Porch

The Living Room

throughout the rest of the building.

The building is wired for electric lights throughout, the knob and tube system with outlet boxes being used.

The building is heated with a hot water Honeywell system, automatic control. A Gurney boiler and Gurney radiators were used in connection with the heating system. The bath room has a built-in porcelain tub, Siwelclo closet and porcelain pedestal lavatory.

The building is supplied with its own pneumatic water system, taking the water from an artesian well.

This residence was constructed for Jacob Keeling, North Church Street, Naugatuck, Conn., in accordance with plans and specifications prepared by F. Alton Clark, architect, 110 Church Street, Naugatuck, Conn.

The doors are of birch, being designated as Korelock, Colonial design No. 480. The kitchen doors are of fir. The front entrance door is a solid oak Dutch door. A Dutch door from the pantry to the back porch is a special feature, it being used in connection with the icebox.

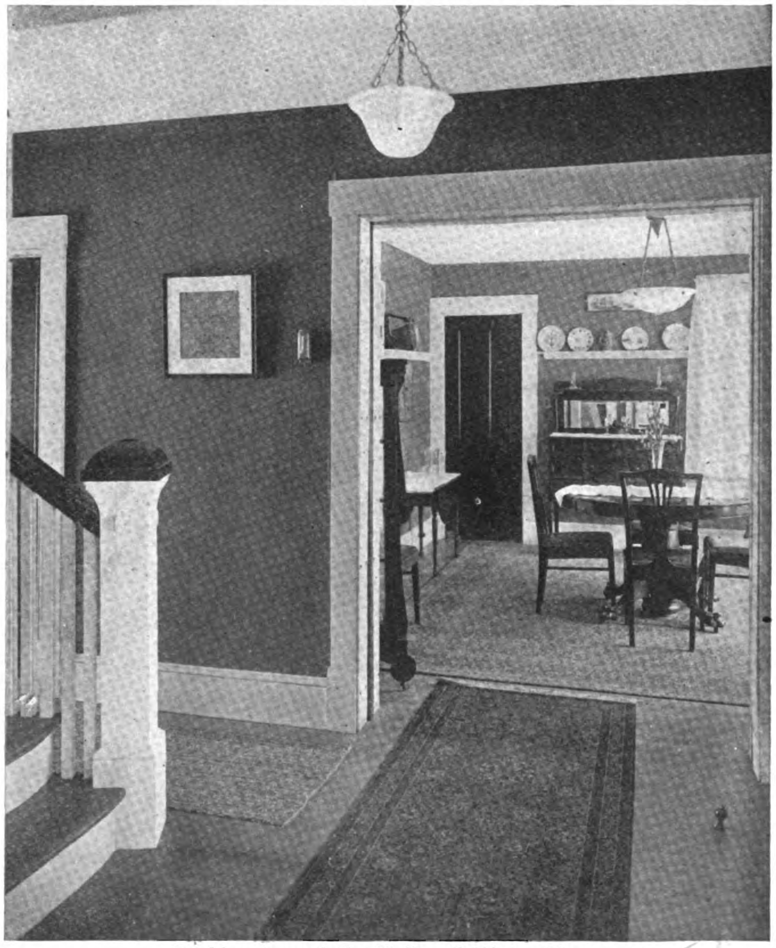
The stairs have Oregon pine risers and white oak treads, the rail being of ash stained mahogany.

The windows are glazed with American sheet glass, excepting the front windows which are glazed with plate glass. Whitney casement windows are used on the stair landing, being glazed with beveled plate glass. The inside doors are stained mahogany, excepting the kitchen doors. The fireplace in the living room is of dark red brick.

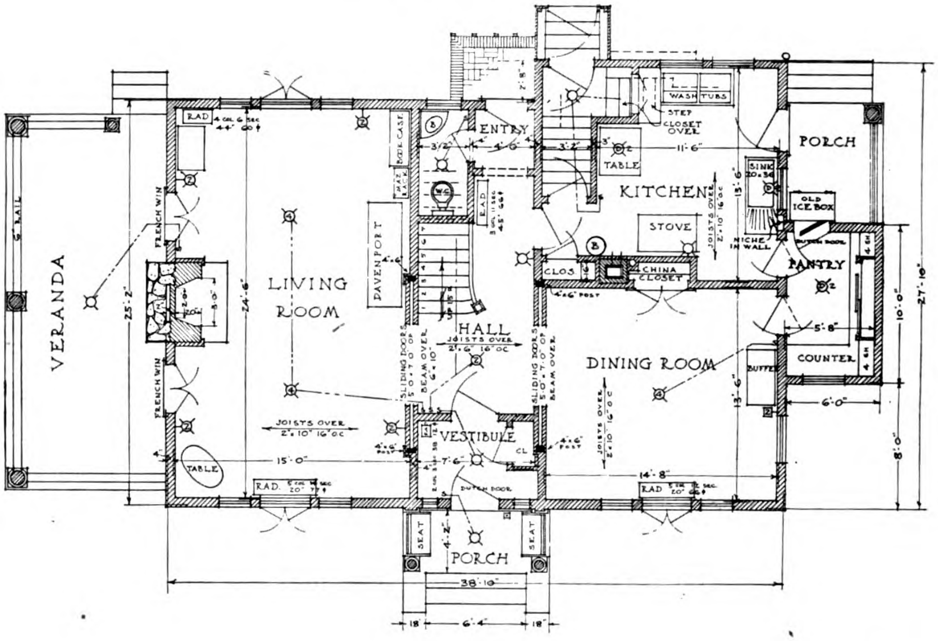
The front and rear porch entrances are paved with tapestry brick, with white cement joints.

The interior decorations and furnishings are antique in style, this being in keeping with the Dutch Colonial spirit which the house so closely follows.

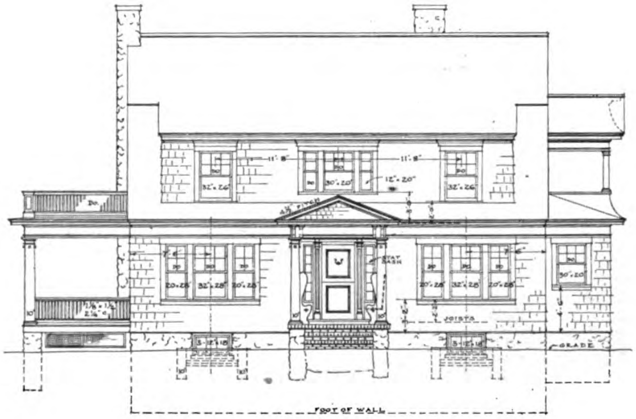
Hardware for the Dutch door sets is of solid bronze, with solid bronze lifting butts for the pantry Dutch door. Solid bronze sectional hardware was used



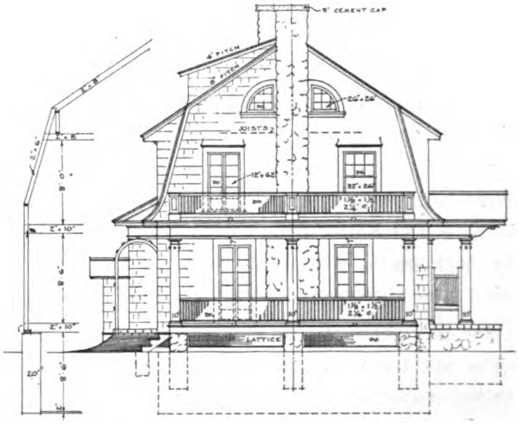
Looking toward the Hall and Dining Room



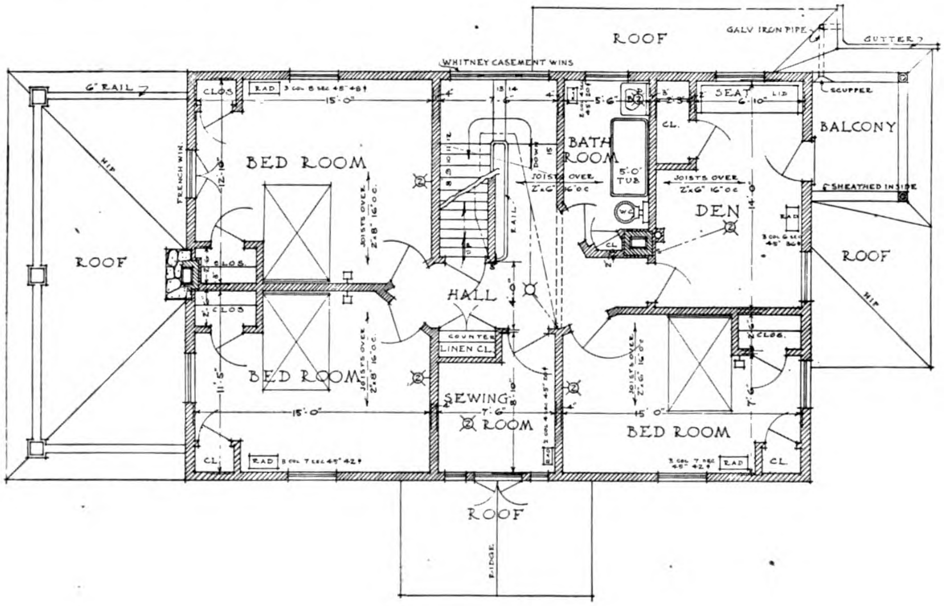
First Floor Plan, Scale 3/32" = 1 ft.



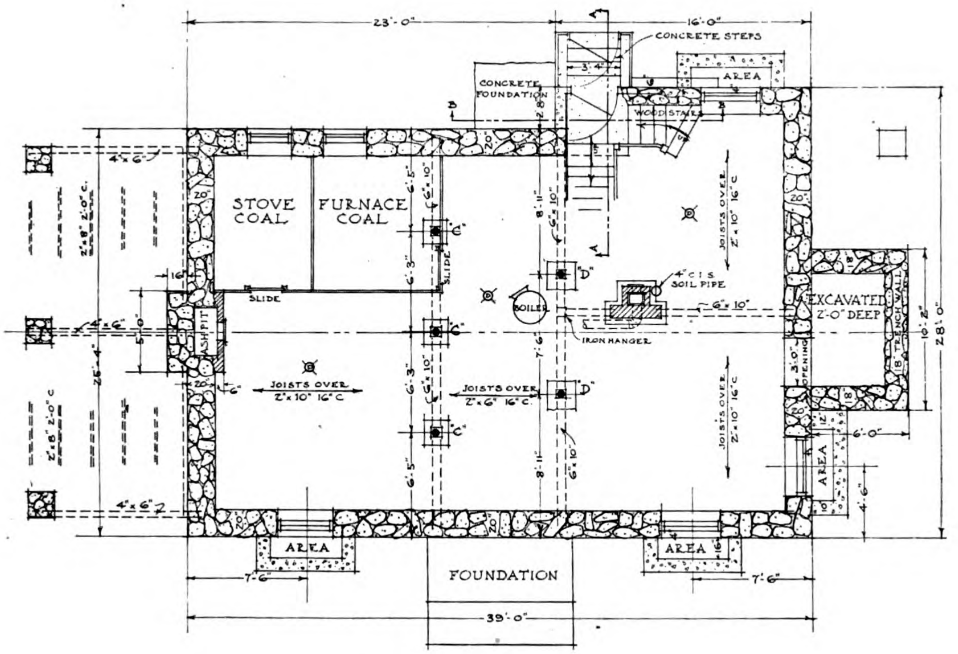
Front Elevation, Scale 1/16" = 1 ft.



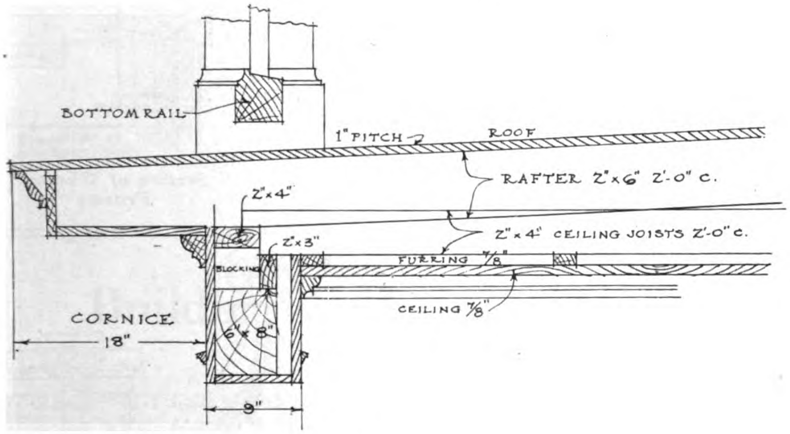
East Side Elevation, Scale 1/16" = 1 ft.



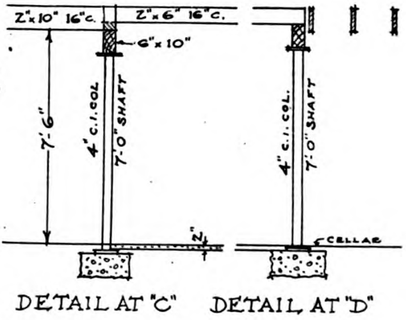
Second Floor Plan, Scale 3/32" = 1 ft.



Basement Plan, Scale 3/32" = 1 ft.

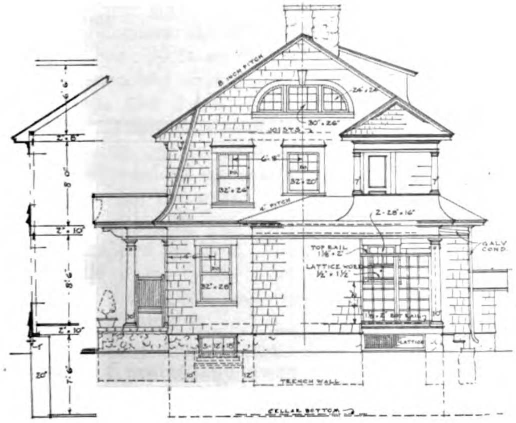


Details of East Veranda

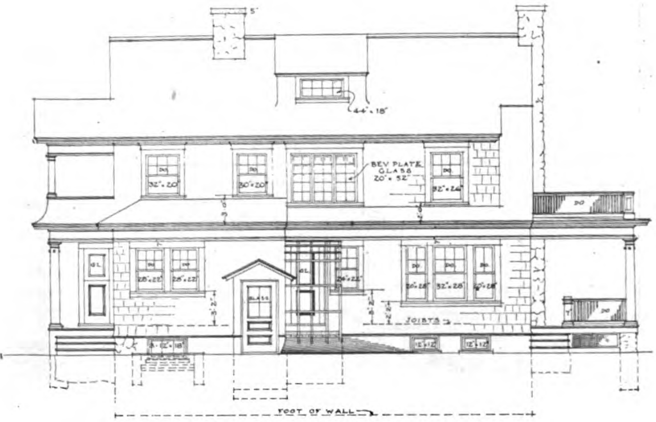


DETAIL AT "C" DETAIL AT "D"

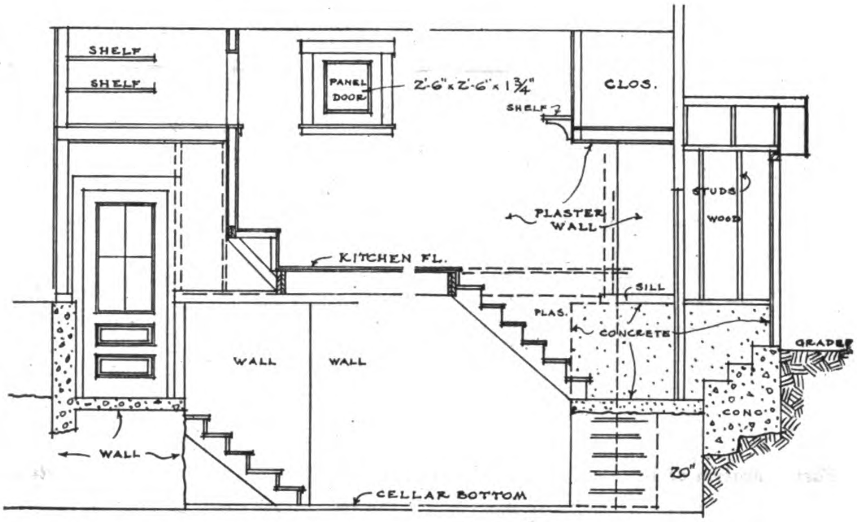
Details of Columns, Letters Referring to Basement Plan Above



West Side Elevation, Scale 1/16" = 1 ft.

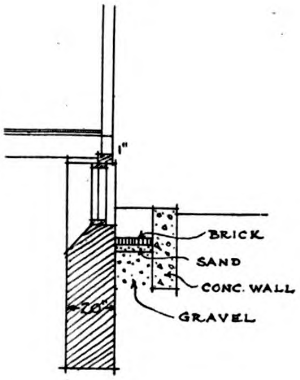


Rear Elevation, Scale 1/16" = 1 ft.

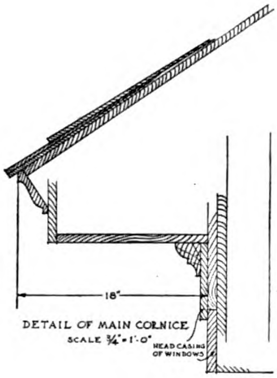


Section on Line BB, Basement Plan

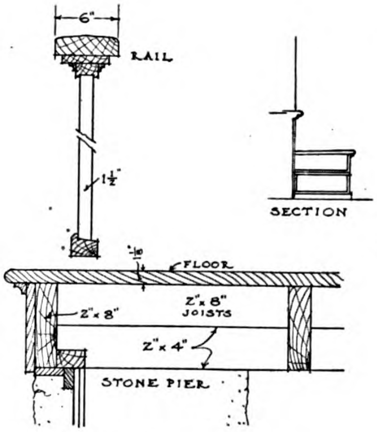
Section on Line AA, Basement Plan



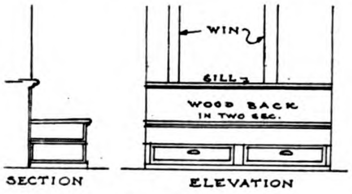
Section of Area



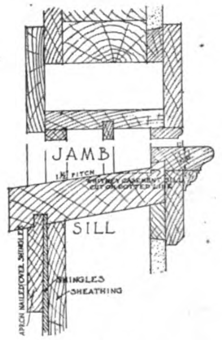
The Main Cornice



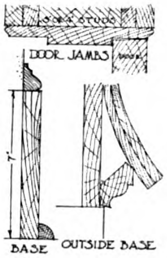
Detail of Rail and Floor of East Veranda



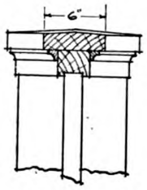
Seat in Den



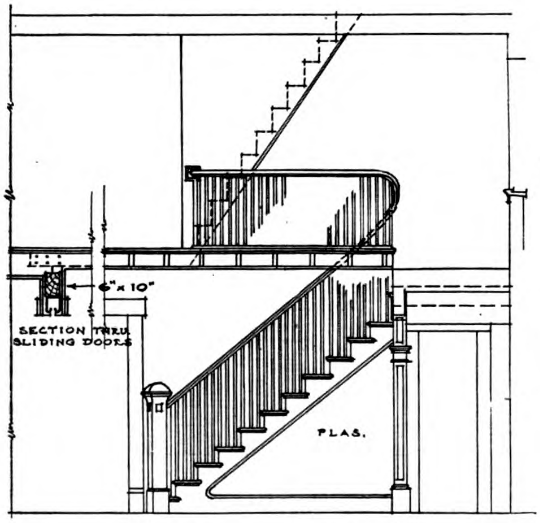
Section of Window Frames



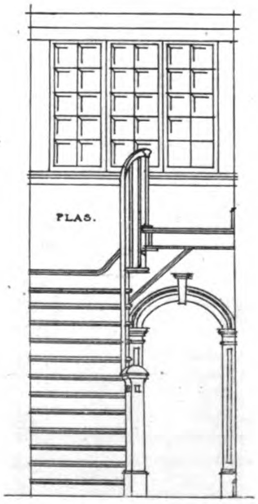
Section Showing Base, Outside Base, and Door Jambs



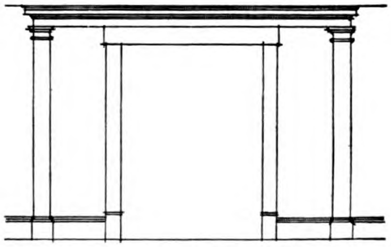
Section of Top Rail of Balcony



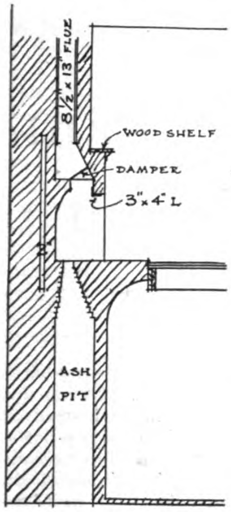
East Elevation of Staircase



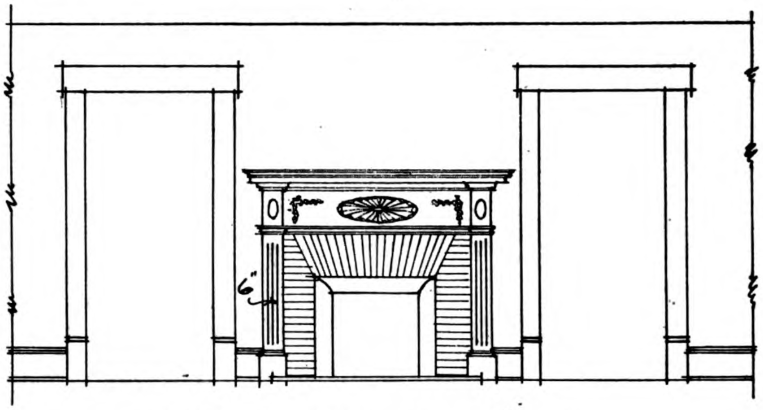
South Elevation of Staircase



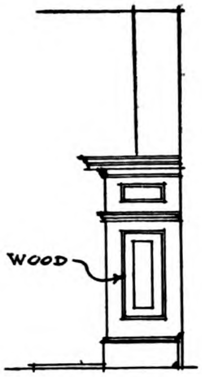
Elevation of Doorway Between Living Room and Hall



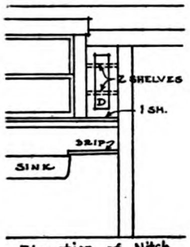
Section Through Fireplace



East Elevation of Living Room and Fireplace



Side Elevation of Mantel



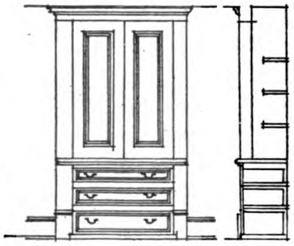
Elevation of Nitch over Sink

South

West

North

Elevations and Sections of Pantry Fixtures



Elevation and Section of China Closet

Building a Modern Hog House With Six Pens

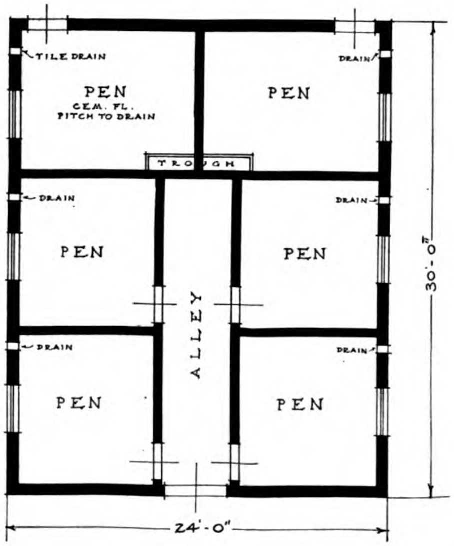
By John Upton

I RECENTLY built a modern hog house which seemed to be quite well designed for its purpose. The building was 24 x 30 ft., the long way north and south.

There was a 4-ft. door at the north end and small doors at each of the south corners. An alley led from the door back 20 ft. so that all pens could be reached from it. The four front pens had doors opening into this alley. There were three windows on each side, one for each pen. A drain was provided for each pen, by a tile through the wall.

The outside wall was 8 in. thick and 2 ft. above the floor. The partition walls 6 in. thick. Side studs were 5 ft. high. The roof was one-third pitch, shingled.

The floor of concrete was sloped toward the drains and away from the trough and sleeping platform, which was of plank a few inches above the floor.



The space overhead was floored with loose boards and filled with straw for warmth and ventilation.

In putting up forms for such a wall if one can have the door frames at hand it is well to set them in place, putting in bolts to hold them, but if this cannot be done the bolts should be put in the walls, projecting enough to receive the plank frame. This can be done by boring holes in the boards which come where the door frames or jambs are to be put later. Bolts should also be put in for fastening the sills down. This building was covered with 2-in. plank taken from a tub silo. Inch coping would have answered as well. The silo stuff would have made a good frame. Such a building would cost quite a sum at present prices, but would be a good investment for any farmer who keeps hogs.

Important Features of the Annual Convention of the National Association of Builders Exchanges

MANY important matters relating to the welfare of the building industry of the United States were considered at the seventh annual convention of the National Association of Builders' Exchanges, held in Pittsburgh on Feb. 5 to 7 with headquarters at the William Penn Hotel. Chief among these matters was the federalizing or co-ordinating of the industry to meet war time needs. Other subjects acted upon were the third edition of the revised standard contract documents, the provision of a code of ethical practice applicable to the country as a whole and the expression of the convention on the ever-present labor problem.

Despite the frigid weather immediately preceding the meeting and the transportation difficulties growing out of the enforcement of the fuel administration's order the convention was well attended. Nearly every State in the Union was represented, and the cities nearby sent large delegations, making up whatever losses there may have been from a distance. The program was replete with entertainments, especially for the visiting ladies, who were kept busy with luncheons, theater parties, dances, shopping trips and other diversions.

Preceding the convention a conference of secretaries was held under the supervision of Samuel B. Donnelly, secretary of the Building Trades Employers' Association of New York City. At this meeting various topics related to the work of the managers of the exchanges were discussed. Arrangements were made whereby there will be a frequent exchange of information among the executives as to new developments during the year. This will be managed through a central bureau or clearing house, and it is thought will be of great value.

Following an invocation by Rev. R. F. Galbraith the visiting builders were welcomed by Mayor E. V. Babcock and H. L. Kreusler, vice-president of the Pittsburgh exchange. A response was made by I. H. Scates, secretary of the Baltimore exchange and former secretary of the National. An address by Clifford B. Connelly, dean of the School of Applied Industries, Carnegie Institute of Technology, on "The War as a Challenge to Better Industrial Relationship," featured the first afternoon session. "Ten months of war have done more to restore the balance between capital and labor," he said, "than a generation of agitation and actual operation of industrial reform. The lack of trained workers brings out forcibly the need of increasing our training facilities. The technical schools can help if they try to supply this need." In his annual address President R. K. Cochrane recommended that the association place itself on record in reference to principles which should govern the relationship between employers and employees, and that a committee be appointed to study safety methods as applied to the building industry. Secretary E. M. Tate in his annual review showed a substantial growth in the number of affiliated bodies and a surplus in the treasury.

Col. John R. Wiggins, newly elected president

A very instructive treatise on "Bonding as It Pertains to the Building Business" was read by William B. King, Esq., of Washington, D. C., legal counsel of the association. The quantity system of estimating was explained in a paper by W. Sullivan Jones, architect, of New York City, who commented on the advantages of the system as well as some objections to it. This system is being tried in Milwaukee, St. Louis, Des Moines and other cities in a more or less experimental way. Mr. Jones stated that in 1912 more than a billion and a quarter dollars was expended in building operations in this country with an average of ten bidders to the contract. In preparing their bids each contractor was put to a large expense, which could be eliminated if the quantity system were adopted. Further Mr. Jones said: "It eliminates the gambling element in bidding because under it estimates are based on a definite quantity of materials and a definite quantity of labor instead of the amounts which John Smith's drawings and specifications call for as compared with Tom Brown's opinion of the same subject. The bids, being based on the same amount of work, are truly competitive. The cost of bidding is reduced because the billing of quantities is done only once.

"The payments to the contractor may be computed with greater accuracy and fairness than is now possible. The extras and reductions are almost automatically adjusted, bids depending upon the efficiency of the contractor, instead of on his shrewdness. It aids the architect and engineer in producing more complete and definite drawings and specifications."

The slogan "Business as Usual" was given the compliments of Dr. J. F. Holdsworth, dean of the school of economics, University of Pittsburgh, who held that the principal business just now was to win the war. If this means sacrifice and interference with regular business all should patriotically accept the terms.

Code of Ethical Practice for the Builder

In a report on ethical practice the committee urged the following among other recommendations:

(1) When a general contractor plans his bid with the architect, he shall also place a copy of that bid with the proper officer of the exchange or association, to be opened and tabulated within one hour after the set time.

(2) That sub-contractors file bids at the time the general contractor submits his, the bids to be tabulated within one hour and be open to inspection by any sub-contractor bidding on that work in his particular line.

(3) Where bids are asked and no award is made compensation should be paid to lowest bidder.

Recommendation for Settling Labor Troubles

A lively discussion characterized the report of the labor committee, developing the fact that this subject is regarded differently in various sections of the country. From this fact and also the feeling that the exchanges are not in their form of organization equipped to handle these difficulties it was recommended that employers' divisions be established to act upon such matters in each locality. Some general propositions

were indorsed, such as the elimination of the sympathetic strike, the settlement of jurisdictional disputes, which have been a nightmare to contractors, and the adoption of the principles of arbitration.

It was declared by the Committee on Plans and Contracts that the revised new standard documents prepared by the American Institute of Architects and the builders are now the most equitable and comprehensive forms obtainable. The convention strongly urged that these forms be used as a means of reducing friction and at the same time elevating the business.

Building Industry to Be Represented at Washington

General approval was given to the movement to unify the industry and provide a central agency at Washington authorized to represent the building interests of the entire country. The resolution on this subject was adopted with a show of enthusiasm and was as follows:

"Whereas, investigations by various local associations, both trade and civic, are now in progress throughout the country, having for their object the securing of reliable information relative to existing conditions in the construction industry for the guidance of the government in its relation to this industry, and

"Whereas, government officials have expressed the wish that representations on behalf of all industries should come from authorized sources of national, rather than local, scope, therefore

"Resolved that the President of the National Association of Builders' Exchanges be and he is hereby requested to appoint a committee of three prominent members whose duty it shall be to represent this association in a movement for the federalizing of our industry for effective co-operation with the government. We suggest that the aid of other national associations connected either directly or indirectly with the industry be sought in this movement with the following object in view:

"First. To afford the government accurate knowledge as to conditions touching the supply of materials, workmen and capital.

"Second. To obtain such government consideration as may tend to sustain the industry on a basis of organization and efficiency to meet the demands of war time and the period of reconstruction thereafter.

We strongly recommend that a national construction advisory board be established with headquarters in Washington to counsel with the government on matters pertaining to building construction. This board is to serve as other similar boards, such as the shipbuilding or the navy advisory boards are serving. It should be composed, in our opinion, of architectural, engineering and building experts, as well as representatives of the material interests and of labor. We believe that the need of such a board has been manifest and that improved results in government building undertakings would follow its creation.

As an organization we pledge our loyal and earnest support to the government and place the facilities of the association at its disposal in this branch of effort so important to the winning of the war.

The Housing Problem

The housing problem of the country was ably discussed in a paper by H. G. Farmer, civil engineer and sociological expert of Chicago. The speaker said that bad sociological conditions were a menace to national defense, that labor turnover was caused by bad housing and that the workers, now being able to pick their jobs, sought districts with the ordinary, safe conveniences of life in houses adjacent to or near the mills. The speaker said that sufficient workmen would be in as great demand after the war as now and it behooved the builders to take up the propaganda of better homes for workmen and to let manufacturers know that good homes would conserve the human element.

Of special significance from the industrial angle were the figures produced, showing that mill districts of America having good homes were marked with the highest production on account of the morale of labor and the enthusiasm of skilled workmen. The speaker described the various kinds of homes and domiciles for workmen with sanitary equipments.

A somewhat extended controversy arose over a proposition to increase the per capita dues from 25 cents a year to $1. The vote showed a clear majority in favor of the higher rate, but since an amendment to the constitution was involved requiring a two-thirds vote it failed to carry.

The new officers elected for the ensuing year were as follows: President, Col. John R. Wiggins of Philadelphia; first vice-president, Charles W. Bernhard of Atlanta; second vice-president, C. A. Dubel of Sioux City, Iowa; treasurer, B. M. Freeman of Columbus. The president is to appoint the secretary.

Milwaukee will be the next convention city and the meeting will probably be held during the month of February, 1919, the exact date to be fixed by the board of control.

New Publications

ARCHITECTURAL DRAWING. By Ralph F. Windoes and Harvey B. Campbell.

The building mechanic who has gathered some knowledge of the art of drafting will find this book of value in furthering his knowledge of architectural drawing, for it is thoroughly practical in its subject matter and the various details are clearly presented.

The book is elementary in character and takes up in logical order the various steps in drawing. Lettering, in which all draftsmen must be proficient, is first considered, the style illustrated being the usual architectural lettering—not the engineering method advocated by many text books. From this, the student is led gradually through the drawing of foundation walls of various materials, their proper damp proofing, the established methods of indicating materials; the details of framing, both Eastern and Western methods being illustrated; construction of different kinds of cornices; the detailed framing of windows and doors; kinds of wall covering, both exterior and interior; stairs, etc. Each of these subjects is explained in the text so that the main features may be grasped and understood. Standard inside and outside moldings are illustrated and a good general outline of this subject is presented.

After the description of the house is completed the student is shown how to lay out a plan on cross section paper and to work up finished drawings from which a structure can be built. The theory of perspective, shadows and rendering is briefly taken up. A typical specification is given so that some understanding of of its province may be gained. One of the closing chapters treats of plumbing for the average house and there is also a brief description with illustrations of the various types of heating installations.

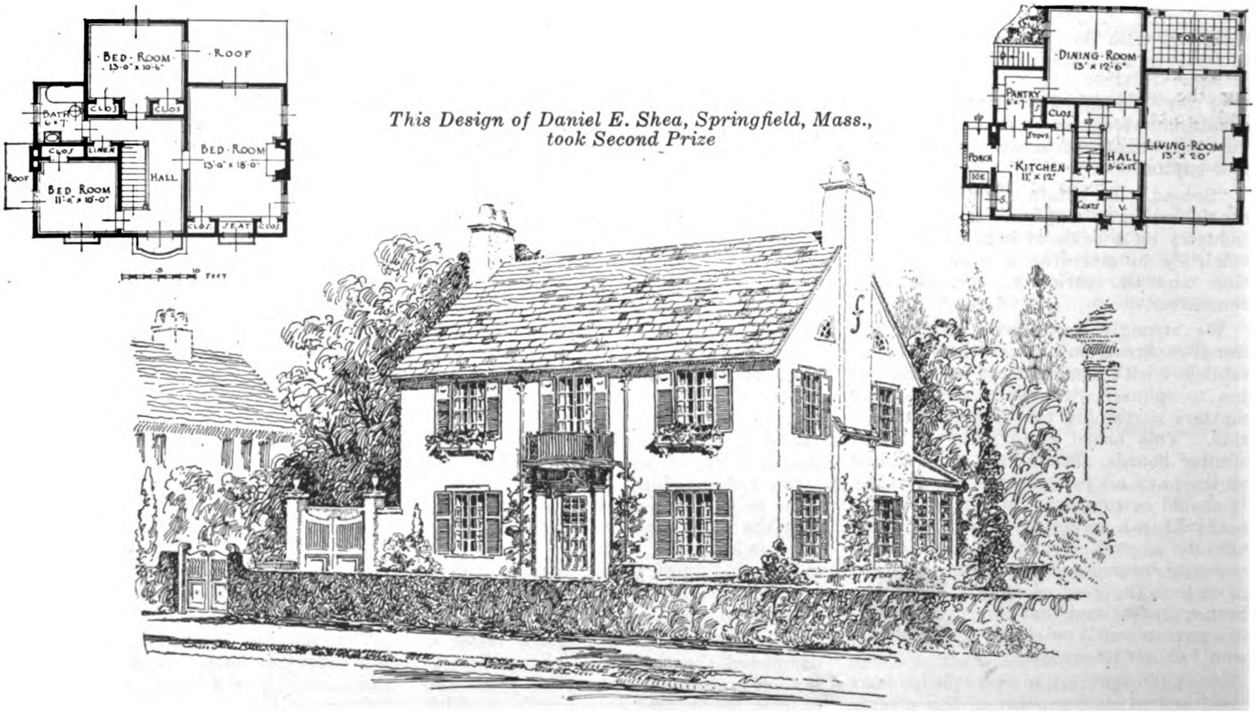
A valuable feature of the work is a chapter devoted to data as to the average sizes of furniture, plumbing fixtures, life of various building materials together with their depreciation; sizes of brick, hollow tile and cement block, safe working strength of different kinds of timber; flue sizes, stock door and window sizes, and other information which is of value when it comes to the working out of various details of construction. A closing chapter of suggestive designs illustrates attractive small houses and their plans.

In preparing the subject matter for use in secondary schools, the authors, who are well-known drawing instructors, have expressly devoted themselves to a text suitable for teaching purposes and the carpenter or builder who wishes to study by himself will therefore find the principles set forth easily understandable.

The book has 149 pages, size 11x8 in., is illustrated, bound in cloth, sells for $1.50, and is published by the Webb Publishing Co.

This Design Took First Prize. It is the work of Fred Wells, Toledo, Ohio

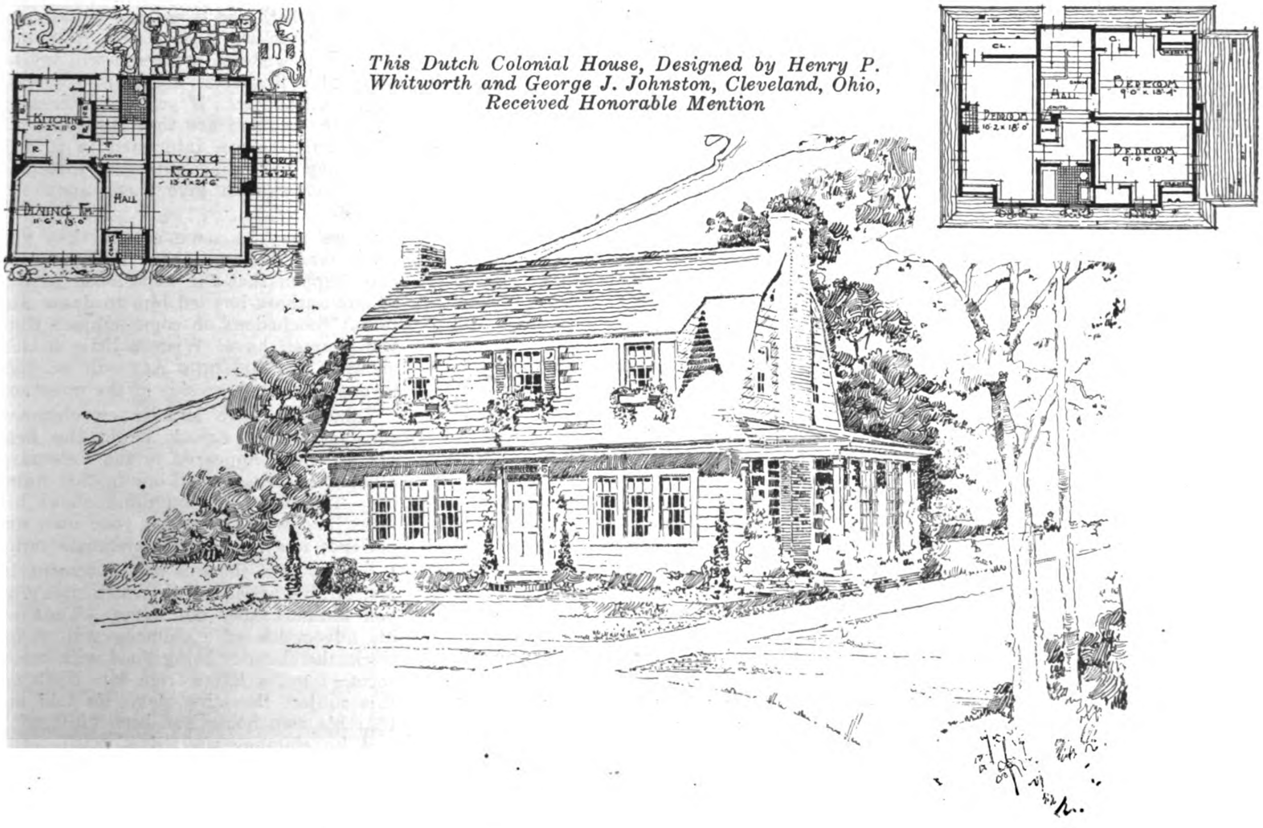
Some of the Designs Submitted in Competition, Held at Colum



This Design of Daniel E. Shea, Springfield, Mass., took Second Prize

The Design of E. B. Burt, Oakland, Cal., Received Honorable Mention

the Real Estate and Building Show
bus, O., January 21-30, 1918



This Dutch Colonial House, Designed by Henry P. Whitworth and George J. Johnston, Cleveland, Ohio, Received Honorable Mention

THE EDITOR'S PAGE

ENGLISH HOUSING SITUATION A WARNING TO THE UNITED STATES

A SERIOUS menace to the industrial welfare of this country is to be seen in the advocating of a ban upon building projects, together with such official statements as the following, by Secretary McAdoo:

"Because of the interest of the Treasury Department in the conservation of capital and credit during the period of the war, I have received several inquiries as to whether building operations of one kind and another should be discouraged. With regard to plans for public buildings under the control of this department, I have stopped letting contracts except in cases where they were absolutely necessary.

"Home building is an excellent thing in normal times, but at present, unless there is a real shortage of houses for war-workers, I strongly advise that materials, valuable labor, and credit be not utilized for this purpose. Whether homes should be built should be determined strictly by the urgency of the need."

Bankers are all too often refusing to loan money for home or apartment building projects, with the result that the present housing shortage is rapidly increasing in seriousness.

England put a ban upon housing construction at the beginning of the great war. She enacted a law prohibiting construction work of all kinds in the United Kingdom, and since that time building operations exceeding £500 have not been allowed. Of course Government work and construction meeting war needs, under special license, were excepted.

The result of this law has been serious indeed. The complete cessation of residential construction has resulted in a decided house shortage, especially in districts given over primarily to the laboring classes. The English Government is now absolutely alive to the fact that this law has caused unlooked for results, and that a comprehensive housing program must be undertaken immediately upon the cessation of hostilities. Definite steps along this line are now being taken.

It is estimated by British Government authorities that at least 300,000 houses must be built by the state for the working classes in England and Wales alone, and that a minimum of 400,000 men will be required for the erection of the needed houses. The Government has been forced to the conclusion that it must itself do much of the construction work, as private interests are incapable of the huge task confronting them.

Just stop a moment and think of the obstacles that are going to stand in the way of meeting this housing shortage in England. With the scattering of labor forces that have resulted from the years of war, the outlook in England is indeed gloomy.

Yet bad as is the situation in England, due to the unwise curtailing of building operations, it would be worse in the United States if any such bill should force its way through against the better judgment of Congress and the business men of this country. England had to import much of her building material; she needed the shipping for war purposes. We manufacture our own materials, from footing to ridge. England can draw from us for her needed material. We can economically draw only from ourselves.

A brief moment's thought along the lines suggested will show just how urgently the cool, level heads of Americans are needed to avoid the practical elimination in this country of one of the world's fundamental industries. There is a shortage of houses here now. Our Government realizes this, and will undoubtedly take heed of the seriousness of the situation, as present indications seem to show. But we cannot and must not have legislation which will cause us to face any such extensive housing problem as faces England.

A pardonable pride in the wisdom of our Government assures us that we need not fear that the mistake of our Ally will be repeated here, once the seriousness of the result of the anti-housing propaganda is realized.

ON THE CONVENTIONS JUST PAST

The months of January and February have brought forth once again the worth of conventions. Man after man has made his way from his own little circle so as to learn what his competitors in the next town or state were thinking and doing.

And the benefits received have amply repaid the trouble taken, for the man who goes forth broadmindedly to lose a bit of his moss returns to his home town better able to meet the problems that arise in his daily work.

Here is the spirit that characterizes the successful convention. Suppose that you have a dollar and I have a dollar. We swap. Neither of us is any the richer. But suppose that you have an idea and that I have an idea. We swap. You have my idea and I have your idea. But each of us still has his own idea, so that we are both 100 per cent richer.

And it is upon that basis that the successful convention must rest. Does it give those who attend a broader vision and a better insight into the vital features of their business? If it does, then that convention goes down as a milestone in the lives of those who have sought its helpful influence.

That many such milestones have charted themselves these past two months is a certainty. The men who have unselfishly given themselves to the betterment of their fellows by the time and knowledge that they have contributed to their various organizations have reason to feel that the efforts of this year have not been in vain.

WRITE A LETTER TO THE EDITOR

Have you ever stopped to think that the editor likes to get letters? Well, I do. I am always interested in having some reader sit down and tell me just what he thinks about the paper.

You know that I am trying to get the greatest possible amount of information into the paper each month, the kind of information that is just what you people want. Whenever I get a chance to do so, I go out and talk to men on the job and find out just what they are interested in. Then I come back to the office with a lot of new ideas that help me to get out a better number than ever.

But when I am too busy to go out and talk to you builders, I have to keep in touch with you through the letters that come into the office here. Lots of you undoubtedly have some little problem that has bothered you and which you would like to see explained in BUILDING AGE. Just write to me and I will try to see that a first-class article is prepared upon that subject. If you are interested in it, the chances are that thousands of other builders are interested in it and that they will appreciate any information that we can give them upon the subject.

There may be some article that you don't like. Tell me about that too. It may happen that the experience of one of our authors has led him to draw different conclusions on some subject than you yourself have. Write a little article about it and BUILDING AGE will be glad to pay you for your side of the question.

Take those two articles on chimney construction by Ernest Drah, the first one of which appeared in the February number and the second one in this number. Tell me what you think about his ideas, and whether or not your own experience has borne his statements out.

I know that there is one statement in Mr. Drah's articles with which many of you builders may not agree. That is, his advocation of a chimney wall 8 in. thick, the chimney being lined with terra cotta. I got a letter from Mr. Drah on this subject the other day. He told me that his own house had been built with a 4 in. chimney wall, lined with terra cotta as is the usual custom. Soot accumulated in the chimney, and it caught on fire, with the result that the

house was considerably damaged. He therefore feels more strongly than ever that an 8 in. chimney wall lined with terra cotta is not only advisable but absolutely necessary for the safety of the house.

Whenever you've got an idea that you think will either help your friends in the trade, or which help me to run **BUILDING AGE** better, please send it along. Remember that I want to hear from you and that every letter that I receive will help me to get out a better paper and one that will be better fitted to help you yourself on the job.

Just address your letter to the Editor, **BUILDING AGE**, 243 West 39th Street, New York City.

Building Activity Througout the United States

A LOSS of 45 per cent in new construction is shown for the month of January, 1918, as compared with January, 1917. Of the various sections of the county, the Southern shows the smallest loss, this being 39 per cent. Cities located in the Middle States make the next best showing, 42 per cent, with Eastern and Western cities showing respectively a loss of 47 and 48 per cent. The showing is, however, better than for the month of December just past.

Building departments throughout the country state that new construction and repair work have been considerably hampered by the bad weather prevailing throughout the country. Many, however, are optimistic and hope that the acute need for new construction in their localities will force activity.

High prices of materials and labor shortage are also reported to have exerted considerable unfavorable influence upon building projects. It is to be hoped, however, that the public will soon appreciate that building costs have risen very little in comparison with other lines. This fact seems to have already been realized to a certain extent, for there appears to be more inclination now than for some time past upon the part of builders to go ahead with contemplated projects.

CITIES IN EASTERN STATES

	January, 1918				January, 1917			
	New Work		Repairs		New Work		Repairs	
	Permits	Value	Permits	Value	Permits	Value	Permits	Value
Altoona, Pa	1	$300	11	$5,085	2	$12,000	16	$9,093
Atlantic City, N. J	3	1525	52	73,862	14	69,500	99	104,457
Auburn, N. Y	..	....	4	7,275	4	10,600	3	4,300
Binghamton, N. Y	20	9,565	50	12,161.25	33	107,605	132	38,088
Beverly, N. J	8	4,895	...	....	...	23,462	...	....
Boston, Mass	13	278,250	145	283,032	133	3,433,180	267	741,571
Brockton, Mass	6	4,210	6	22,600	13	28,220	10	8,660
Buffalo, N. Y	76	418,400	15	18,600	129	260,650	40	24,350
Hoboken, N. J	4	9,550	7	4,000	4	6,900	12	14,090
Holyoke, Mass	1	500	...	....	2	2,800	...	....
Lawrence, Mass	2	2,700	3	3,700	3	18,400	5	3,100
Mount Vernon, N. Y.	2	40,200	5	2,100	10	41,850	9	2,415
New Bedford, Mass	9	90,775	...	....	15	36,300	...	....
New Britain, Conn	8	29,450	...	....	20	40,950	...	....
New York:								
Manhattan	17	1,481,700	182	696,091	39	4,464,800	278	1,450,205
Bronx	9	478,850	71	20,521	25	692,875	163	124,452
Brooklyn	73	1,369,150	329	900,914	139	1,943,900	691	403,007
Niagara Falls, N. Y	3	7,100	2	725	10	17,225	...	....
Nutley, N. J	..	....	3	430	6	15,925	2	110
Passaic, N. J	..	....	3	4,350	...	63,385	...	....
Paterson, N. J	1	1,500	20	7,594	22	60,948	24	27,434
Philadelphia, Pa	99	1,491,950	151	192,560	317	1,912,220	296	232,410
Pittsburgh, Pa	51	265,290	34	49,125	82	414,022	77	321,101
Portland, Me	5	10,150	10	36,675	6	22,200	11	16,050
Reading, Pa	3	2,600	39	33,525	12	24,025	51	1,635
Rochester, N. Y	13	40,600	23	76,070	62	361,825	56	105,548
Schenectady, N. Y	2	512	7	5,540	9	27,970	5	2,910
Scranton, Pa	8	15,600	...	....	32	73,865	...	....
Syracuse, N. Y	12	20,800	31	44,600	50	131,015	34	34,225
Trenton, N. J	10	17,270	...	....	37	53,316	...	....
	459	$7,635,362	1203	$3,705,099	1238	$14,570,183	2286	$6,771,372

CITIES IN SOUTHERN STATES

	January, 1918				January, 1917			
	New Work		Repairs		New Work		Repairs	
	Permits	Value	Permits	Value	Permits	Value	Permits	Value
Atlanta, Ga	33	$99,586	51	$20,195	62	$394,610	97	$66,468
Baltimore, Md	27	92,717	333	90,898	...	533,320	...	193,630
Birmingham, Ala	18	17,040	155	26,907	56	85,962	230	37,553
Charlotte, N. C	14	11,375	8	4,183	25	68,145	...	10,000
Corpus Christi, Texas	7	930,000	...	....	21	12,480	...	....
Dallas, Texas	28	143,116	27	238,825	90	598,702	19	8,775
El Paso, Texas	72	56,340	...	....	162	407,107	...	....
Louisville, Ky	6	23,490	23	10,276	56	159,830	53	19,150
Miami, Fla	..	107,500	...	....	...	79,000	...	....
San Antonio, Texas	235	302,210	...	....	164	100,315	...	....
Tulsa, Okla	77	1,079,542	17	14,520	130	1,017,699	13	47,790
Washington, D.C	17	88,900	110	113,225	112	1,206,200	186	100,800
Wilmington, Del	9	6,075	24	25,721	70	191,488	31	17,373.50
	543	$3,767,891	748	$544,750	948	$4,854,858	629	$2,221,516

CITIES IN MIDDLE STATES

	January, 1918				January, 1917			
	New Work		Repairs		New Work		Repairs	
	Permits	Value	Permits	Value	Permits	Value	Permits	Value
Akron, Ohio	49	$73,495	4	$101,050	230	$51,933	40	$41,450
Cedar Rapids, Iowa	6	6,000	2	2,000	14	43,000	4	5,000
Chicago, Ill	58	3,388,600	132	58,780	308	4,807,700	280	112,200
Cleveland, Ohio	47	242,800	215	120,660	223	1,183	391	206,240
Columbus, Ohio	19	32,815	20	45,700	52	110,505	27	26,505
Council Bluffs, Iowa	3	1,100	...	....	...	....	1	400
Dayton, Ohio	34	90,785	...	....	92	233,104	...	....
Duluth, Minn	21	37,000	11	3,485	29	78,975	19	16,090
East St. Louis, Ill	5	18,075	...	....	22	27,025	...	....
Evansville, Ind	2	5,050	5	6,550	20	86,940	37	7,315
Ft. Wayne, Ind	9	16,675	...	....	18	62,250	...	....
Grand Rapids, Mich	21	312,860	...	....	60	207,035	...	....
Joplin, Mo	9	7,940	6	1,020	39	68,150	14	2,700
Kansas City, Kan	9	123,820	...	....	44	77,230	...	....
Lincoln, Nebr	17	52,500	...	....	15	24,855	...	....
Milwaukee, Wis	45	228,990	...	....	65	298,137	...	....
Minneapolis, Minn	124	292,770	...	....	163	263,485	...	....
Richmond, Ind	3	5,400	2	900	4	8,200	3	1,500
Saginaw, Mich	1	39	2	5,000	7	11,000	1	600
St. Louis, Mo	33	79,700	174	87,619	173	2,137,842	465	149,002
Sioux City, Iowa	15	42,599	...	....	22	135,200	...	....
South Bend, Ind	16	15,574	6	9,680	15	145,537	10	18,463
Springfield, Ill	1	4,500	8	4,455	7	15,700	15	7,170
Superior, Wis	6	20,525	21	13,704	7	10,670	6	4,550
Terre Haute, Ind	1	300	6	5,845	10	11,845	20	3,590
Wichita, Kans	30	164,350	5	6,000	40	204,000	8	2,500
	584	$5,192,532	619	$472,448	1679	$9,121,501	1341	$605,275

CITIES IN EXTREME WESTERN STATES

	January, 1918				January, 1917			
	New Work		Repairs		New Work		Repairs	
	Permits	Value	Permits	Value	Permits	Value	Permits	Value
Berkeley, Cal	20	$24,000	19	$11,000	43	$122,000	54	$18,300
Boise, Idaho	..	3,328	9	890	...	8,300	15	3,733
Colorado Spgs., Colo	7	4,025	5	2,680	3	16,300	15	46,295
Denver, Colo	40	53,200	68	85,910	34	59,280	70	37,090
Fresno, Cal	45	46,150	48	11,695	50	214,258	39	11,365
Long Beach, Cal	146	143,690	...	....	88	67,450	...	....
Los Angeles, Cal	573	648,992	...	....	657	4,709,235	...	....
Oakland, Cal	129	168,774	80	27,086	209	396,955	94	36,019
Pasadena, Cal	29	15,758	69	19,366	45	97,414	63	15,460
Portland, Ore	124	73,075	143	53,085	116	175,440	178	96,895
Sacramento, Cal	44	175,016	...	....	88	55,818	...	....
Salt Lake City, Utah	40	150,527	...	....	18	24,000	...	....
San Diego, Cal	30	35,425	59	122,855	40	59,355	68	44,891
San Francisco, Cal	50	456,563	303	119,536	139	1,478,204	417	144,268
Seattle, Wash	782	699,100	...	....	604	500,225	...	....
Spokane, Wash	14	3,970	20	9,000	20	21,445	34	34,910
Tacoma, Wash	85	155,327	63	40,301	48	63,091	47	15,660
	2158	$2,856,920	886	$1,103,404	2202	$7,068,770	1094	$504,886

More Activity Now Is Needed in the Trade

The Impression That Lower Prices Will Come Should Be Dispelled, and the Trade Should Make the Nation Realize That More Building Is a Patriotic Duty

By the Old Retailer

WAR time conditions are having the effect of inducing people to co-ordinate their interest with others and to co-operate in the activities necessary to preserve them. Never before in the history of this country has there been such an awakening to the realization of the inter-dependence of the relations of all classes of people with each other, and we are beginning to recognize as an important fact that no one interest can be injured without its having a corresponding effect on all the others.

> **I have always observed that whenever building activities slow down every other line of business feels it, and should it continue for any considerable length of time there ensues a retrenchment in labor and all other expenditures, and a period of general hard times sets in.**

At the present time there seems to be a disposition in administrative quarters to advise against entering upon any activities of a constructive nature that do not assist those which are necessary for the energetic prosecution of the war. In other words, all building construction and improvements of this character should cease if they are not directly connected with the agencies for carrying on the war. This may be in accordance with theory, but to the writer it looks like a short-sighted policy to eliminate the productive activities of a large portion of our population. By doing this, their purchasing power for other commodities is correspondingly curtailed, and their abilities for purchasing Liberty Bonds is thereby lessened and they will be unable to support the Red Cross, Y. M. C. A. and other means for the care of the Men in our Army and Navy. People have been contributing to these objects out of their daily comings, and not from their savings. Cut off all constructive work as proposed, and it will have the effect to disarrange and reduce a large number of other industries.

The great bulk of our population have little to live on other than the earnings from their labor. Outside of the farmer population, sixty per cent of the rest of the people have not over a ninety day reserve to live on. We are a rich nation per capita, but per-pocketa we are not because we are spend-as-we-go people, and hence the necessity for a continued employment.

The Morale of a Nation is high when everybody is earning more than a bare living. I have always observed that whenever building activities slow down every other line of business feels it, and should it continue for any considerable length of time there ensues a retrenchment in labor and all other expenditures, and a period of general hard times sets in. Building construction and the industries connected with it, are seventy per cent labor. Shut this off and there will necessarily be a proportionate reduction in the purchasing power of the wage-earners and this will affect the business and social activities of the whole country.

While I do not wish to seem to runcounter to the expressed desires of the Administration for refraining from building during the war, nevertheless, my business judgment tells me that keeping business going in the building line will keep the country in better condition for responding to the efforts and sacrifices that will be required of it in financing the government, and keeping the boys in good heart "Over There." Therefore, in view of this, I believe it would be advisable that there should be a movement made by the building material men, architects, contractors, real estate men and all others directly interested to get together in every community for the purpose of studying and discussing the situation and the means whereby the public mind can be influenced to continue on in the necessary normal building improvements.

I really believe this would be a patriotic thing to do. It would keep up the morale of the people as nothing else would. Just think what the psychology is of new buildings going up on the minds of everybody in the community. You and I unconsciously feel more optimistic when we see improvements going on around us, when we see others having confidence enough to spend their money in this way. It inspires us too with desire to do something ourselves. This is the kind of feeling that reacts on us all. When nobody sees any building going on nobody is in the humor to do anything of the kind, and this feeling of doing nothing is sure to spread through the mind of the community and after awhile becomes an obsession.

> **My business judgment tells me that keeping business going in the building line will keep the country in better condition for responding to the efforts and sacrifices that will be required of it in financing the government, and keeping the boys in good heart "Over There".**

If business conditions are unusual, the thing to do is the unusual so as to make them as near usual as possible.

I believe the co-operation of these factors I've mentioned will do something

to stimulate the spirit of improvement. It may not be on as large a scale as usual, but it gives labor to those that need it, and puts money in circulation that people are now holding on to without hardly knowing the reason why they should.

There is an idea now in the public mind that by waiting awhile building materials will be cheaper. A little thinking will show anyone that this will not be so unless the wage scale of labor is materially lowered, and if we judge by the past we know it will not go back to the former scale. There may be some minor reductions, but these will be offset by the reduction of the working hours, and therefore nothing but a wide financial panic will reduce the cost of production as far as labor is concerned. I am of the opinion that it will be many years yet before the prices of lumber will be even what they were previous to our entering the war.

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After this war has ceased the whole world will enter upon such a period of building construction as it has never before seen, and this country will be the Great Reservoir from which to draw the new materials that will be needed. There is nothing visionary about this. It's just as sure as that a farmer will build again after his barn has burned down.

These things concerning building improvements should be given the attention of the community mind through the local town papers and it can be done by the collective effort of the building material dealers and the trades people of the place.

If you are trying to stimulate a man to build or make repairs you must be equipped with intelligent reasons why he need not put it off because of the cost. Take the average country dealer. His dependence for business is practically all on the surrounding farming territory and with the exception of building improvements the town is having a normal amount of business. The principal reason why the town people are not buying much building material is because they have got the "bee in their head" that it is too high. Repairs are being needed in the town as much as ever, but people are talking about them instead of doing because of this obsession they have about the high price of lumber.

The lumber dealers should adjust themselves to this condition by going to work and doing the unusual. Let them imitate the traveling agents who sell pianos or sewing machines and who canvass the town and find out who has not got one of them. They can visit every house and see where there is a new kitchen floor needed, or screens for the windows, or screen doors. Many too are wanting their porch screened, or a new sleeping porch built on.

Take down a list of what a woman wants in her old house and there will be quite a number of things she can have when she finds they won't cost as much as she thought they would. Some of the out-buildings on the place are needing more or less repairing. The lumber sales agent can make a note of all these things, and if he knows what the work will cost he can quote the price of the whole job completed. If he does not know what the work will be, here is when the co-operation of the carpenter comes in for a mutual benefit. Sell the Job, instead of the material.

This line of action can be extended out among the farmers with even more better results. The farmer's business will be driven at high pressure this year and his increased production will necessitate more than the usual amount of building space to take proper care of it. At the same time he will have less time wherein to do the necessary. He has the money, but he can't stop from his farm work to spend it for these things.

There is one thing, however, that he will buy, and that is an auto car. If his old one is not big enough, or a little out of date he will change it for a larger one and of the latest type. But it won't take much of his time to do this. The agent is there on the spot with the new machine for a trial spin, the sale is concluded. It was really made in the farmer's mind before that and originated from the seed sown in his mind from the previous advertising. The fact may be that he really needs more and better building space to take proper care of his high priced products than he does a machine, but that machine has got into his head.

It is the business of the lumber dealer to work upon and change his mind. The average farmer is not much of a figurer. He judges a thing with a preconceived idea. The dealer, by going over his premises with him, should also be able to note what was really needed and tell him what he will sell it for, put up and completed, without his having to take any time from his farm work. This will remove the excuse of his not having time to build. This, of course, is not in accordance with the time honored custom of dealers to wait until the spirit moves the farmer to build and then come in to the lumber yard office and inquire about prices and then look up a carpenter to tell him what he wants and make out a bill for it. But new conditions and new competition are forcing lumber dealers and other business men to change and adjust their methods to meet them.

And so, in this case, the farmer has the money, but no time to build, but he needs the buildings. The dealer has the materials in his yard, carpenters and other trades workmen are needing the work to live on and help pay for the war activities. Is it not therefore the sensible and right thing to do for the dealer to employ the carpenters, furnish the materials and transportation and assume the whole responsibility for the completion of the job, thus furnishing the farmer what he needs, without his having to spend his time, which is more valuable to-day than that of most business men? There is no doubt about this being both practical and practicable. As a matter of fact, this method of buying the completed building can be arranged so that it will cost the farmer less than by the old way. Practically all of the framing can be done at the yard, and a good deal of the other work also. The future lumber yard is going to be a building plant as well, and the finished building will be sold instead of the materials. In fact, there is nothing to hinder the enterprising dealer from going to work now and constructing a number of different small building at the yard that can be loaded on a truck and hauled out to the farm. Even larger buildings can be made in sections and put together where they are to stand. When you come to look into this it is surprising how many of these various small buildings there are about the farm premises and those in the town as well. For the most part, these are primitive in construction, and for the most part, thrown together. Even a pig-house, privy, chicken house and others of this character can be made to look neat and attractive. The farmers need hay racks, feed troughs, water tanks. The women need shelves, ironing boards, benches, clothes line posts, and other little articles of this character; all these can be made at the yard and people will buy them just as they do other things at the implement store or the hardware store where they can buy ready to use.

There is an idea now in the public mind that by waiting awhile building materials will be cheaper. A little thinking will show anyone that this will not be so unless the wage scale of labor is materially lowered, and if we judge by the past we know it will not go back to the former scale. There may be some minor reductions, but these will be offset by the reduction of the working hours, and therefore nothing but a wide financial panic will reduce the cost of production as far as labor is concerned. I am of the opinion that it will be many years yet before the prices of lumber will be even what they were previous to our entering the war.

The making of these things by the dealers can be done when there's little building going on and workmen are idle. It will give them employment and afford some carpenter the opportunity to work out a little account he owes the dealer.

Now, it may be thought by some that what has been suggested in the fore-

going will bring antagonism into the relations of the building trades workman. No one likes to see someone doing a thing which he had not the initiative and enterprise to begin and carry through, and this is about the extent of the feeling that will arise when the small contracting carpenters in a country town see the lumberman putting his business on a better basis and creating a lot of work for them that would not have originated in the usual way. During the war, at least, this Special Service for the farmer is the right thing to do. The farmer's work is the most important factor in this War, and whatever will assist him in conserving his time for production and help him to provide facilities for housing and taking care of what he raises is, I think, doing a valuable service.

Instead of antagonizing the dealer in this work, the contractors and workman would find it to their advantage to assist and co-operate with the creator of business that otherwise would not be done. It is they who will do all the labor on these buildings and they will work for a party who will pay them the same wages. They will be sure of their money, and probably make more than by the old way of competing among themselves to get the business. The dealer will doubtless have to employ a competent workman to act as foreman and superintend the working details of the job, and workmen will be doing the work under a BOSS in the usual way. It is simply a change of paymasters for them.

In view of this, I don't see any good reason why the town carpenters should not willingly adjust themselves to this new departure on the part of the lumber dealer, and go into it and co-operate with him in canvassing the district for business. In doing this they will be working for themselves under his direction.

The probabilities are that there will not be much building of the larger character in the cities this coming year. Many reasons might be given for this lack of activity, but the principal one is, A State of Mind, and as long as this exists it will affect the small building and repair work as well. I believe a lot more of the latter kind of improvements might be done if the building material men would go to work and change this state of mind regarding it. They could do as I have suggested doing in the country districts. It is unusual, of course, for city dealers to do anything of the kind, but these are unusual times and they should infect into their business this year some practical methods to meet the exigency. Hardly any advertising is done by the city dealers through the local papers, and therefore people are allowed to follow their own state of mind. This could be materially changed by the right kind of advertising and then advantage taken of it by the personal equation.

Some Annoying Practices in the Retail Trade

By C. E. Davidson

SELFISHNESS is perhaps man's besetting sin. There is a tendency with some men to indulge in sharp practises, thinking it demonstrates their acumen and capabilities. In this they are mistaken. They are the cads of the business world.

Mr. Tate's Ideas

In a recent issue of The White Pine Series Architectural Monographs is an article by I. N. Tate, assistant manager Wayerhauser Sales Company, St. Paul, Minn., in which he breathes the real, true spirit of mutual co-operation of retailer and wholesaler. Mr. Tate, of course, represents an immense lumber output. His position as sales manager gives him a decided vantage point.

He says "compromise is not always an evidence of weakness. Very often it is the mark of strength. The man with breadth of vision sees not only his own problems, but those of his neighbor, and his every action is modified and changed as he applies this outside knowledge to his own life. I look sometimes at the manufacturer of lumber and wonder if he really has this breadth of vision—if he really senses the peculiar problem of the retailer and adapts his methods of logging and sawing and surfacing and shipping to meet the real needs of the man who retails and the man who uses that lumber."

Mr. Tate's article confirms the opinion that there is not a sufficient spirit of co-operation between retailer and wholesaler, and he is broad enough and intelligent enough to say so. He proceeds then further, and says, "I wonder if the retailer and oftentimes the architect are not too much interested in supplying the written requisitions of the often too exacting contractor, and have neither the time nor the inclination to consider the very definite and inelastic problems of logging and saw-milling, or to modify their sales to meet those fundamental rules under which the manufacturers of necessity must work."

No question about it. Retailers do not thoroughly understand the difficulties of the wholesalers. Likely not one retailer in ten has gone South and visited a mill, gone into the woods, seen the difficulties in logging, etc. But how can they know unless they are taught? The retailers, of course, must take what the mills furnish. They should be taught the possibilities and the limitations of the big saw mill. The floods, the lack of labor, of cars, the demands of the trade which run, at some seasons to all common grades, to others when the trade demands higher grades, etc.

FISHIN'

No use to be wishin'
  It's fishin' that counts—
Fishin' for business
  In larger amounts—
Baiting your hooks
  With service improved—
Casting your fly
  Where the Big fish have moved.
Watchin' for nibbles
  That soon will be bites—
Keepin' your eye
  On the fishin' delights;
Waitin' and watchin'
  And working the while,
Building your business
  Thru fisherman's guile—
Say not a word
  When the fishin' is bad,
Just keep on fishin',
  They'll bit yet, my lad;
Use a better bait
  And fish with more skill,
For fishin' beats wishin',
  So says—"Pastor Bill."
—W. E. Fitch.

A Dealer's Trip South

A lumber dealer last year made a trip to a Mississippi mill which is really one of the big concerns. The sales manager entertained the visitor and his best commission man. He was flooded with orders and inquiries. Inquiry after inquiry was scanned to see if the stock on hand would permit of acceptance. All sixteen foot lengths were forbidden, and nearly all inquiries included those lengths, and so on. They went over to the mill. Here they saw bins and aisleways crowded and jammed with finished lumber. The commission man observing it, said: "Why, here is just what I want for a big order I can place." The manager shook his head, "Been sold for weeks, no cars for that section." The salesman asked if he might begin sending in orders again when he returned home. The answer was no. This sales manager was balancing the needs of his customers with his possibilities and also, more or less, the probabilities.

The retailer's plea is that sometimes heads of manufacturing industry do not take the retailer into their confidence enough, with the result that bitterness and misunderstanding are engendered. Retailers would generally welcome a campaign of education in this behalf.

Mr. Tate is one of the men who is broad-minded and intelligent enough to appreciate these things. He is the real true friend of the retailer. Though representing one of the greatest firms in the lumber business, he is willing to "stop, look and listen."

Dealers Invited to Co-operate

A year or so ago the Southern Pine Association invited representative retailers to meet with their grading committee and make suggestions as to changes to be made. No doubt that the executives, at least, desire to be fair—in fact, we have no doubt of it—and that likely the most of the present annoying practices lie some place between the time when the order is taken by an anxious salesman, who takes a chance, and which is confirmed by some sales manager who sits in a swivel chair in a skyscraper in some large city, hundreds of miles away, and the men in a far distant state, who load the car the best they can.

A Shipper's Complaint

A shipper makes the following complaint: He held the order of a retailer for several cars, all of which had advanced in price, except a car of 2x4, 10's. The retailer, under the excuse of great delay in shipment, cancelled the order for the car of 2x4, 10's, and made demand for the shipment of the remaining cars. The mill man naturally concludes the cancellation of the car of 2x4's was made because of the reduction of the price. Likely he is correct. He sees a lack of the spirit of fair play, and gameness on the part of the buyer.

THE WORLD'S A WHEEL

When your feet get cold, and your blood gets thick,
And your frame gets old, and your heart gets sick,
When you're tired of bunk, and you've lost your pep,
And you're feeling punk, and you're out of step—

When your biz gets bum, and your luck gets bad,
And you lose some sum that you never had,
When you're on the blink, and you're full of doubt,
And you really think you are down and out—

Then I tell you what you have got to do,
When your bolt is shot, and you think you're through:
It's to plug right on, and try to smile,
It's to wait for dawn, and to work the while.

For the world's a wheel, and it turns and turns,
And a man of steel still a lesson learns:
It will come his time on the rising curve—
And he will yet climb, if he keeps his nerve!

Perhaps the great delay in shipment was sufficient cause for the cancellation, providing the retailer could get his stock quicker elsewhere. But under the circumstances the mill had the right to also cancel the remainder of the order, which was a part of the original order, no doubt. While we have not the retailer's side of the story, yet here is an apparent lack of fairness upon the retailer's part.

At a recent lumber association several dealers were comparing notes on delayed orders. A number had delayed orders on red cedar shingles, which were taken by a certain Western commission firm last year with various promises of shipment and at attractive prices. A Western salesman present who knew the parties informed the buyers they need not expect shipment unless, perchance, the market should happen to fall to the level of their orders, which was unlikely, and that if shingles were needed the dealers had better cancel at once and order elsewhere.

The reliable shingle mills are not responsible for such instances, of course. The remedy might be found in the mills refusing to do business with sales firms which are not thoroughly reliable financially and who will keep their contracts. If in doubt require a bond or do anything, or form any plan, which will protect the public. It may be said the buyer should ascertain this fact. That is true in a way, but is not always so easily accomplished.

The New Terms

The new terms which have been proposed by the National Wholesale Lumber Dealers' Association requiring either payment or giving of acceptance immediately upon receipt of the invoice, still lies somewhat in abeyance with the trade generally, yet is now being enforced by some wherever possible. If these terms were changed to allow inspection, which means a settlement when car is received, then there could be no complaint upon the part of retailers.

A promise to pay, placed in the hands of a third party, which would be the case with acceptances, must be met no matter whether the shipment comes deficient, or whether it never comes. The rule is unfair, un-American.

Some Useful Hints for Combating Mail-Order Competition

MANY columns have been printed concerning the best method to combat the mail-order houses. I have often doubted the advisability of openly attacking the mail-order houses in print. If you condemn the mail-order houses to the public you only advertise them. Suppose a man is going to build a house and you have conducted a campaign by which it is known that the mail-order firm furnishes ready cut houses, etc. The prospective purchaser is just now keenly interested in prices, perhaps. You have combated the mail-order houses and advertised them, using no doubt the time honored argument that they take the money out of the county, etc. What does the average man care about that feature? People are not so altruistic that such an argument will have any weight when it costs them any money.

The mail-order house literature can be met, by referring to the question of prices, by an invitation for the people to bring in their bills for an estimate. The mail-order house cannot sell lumber lower than the local retailer. What business he gets is through pretty pictures and a series of letters.

The retailer by fighting the mail-order man openly has only advertised him to a man who perhaps had never thought of asking the mail-order house for prices. The old saying, "every knock is a boost," is true.

The idea for the local retailer to follow is to keep in touch in building with the carpenters and others, and then to send the prospective purchaser circulars and catalogues of plans. Say nothing of prices; that is, only suggestive. For instance: A certain sidewalk contractor would always price sidewalk construction at 8 cents per square foot. He complained that his competitor got all the business, actually over 8 cents at times.

The difference was that the successful man, when asked what he charged, answered he could not tell until he saw the job. He went to the place, made a mental notation of filling and grading, and then figured up the square feet, figured it at 8 cents, but gave the total sum to the owner instead of the price per square foot. He knew the people could readily understand the question of square foot and he adroitly evaded taking the position which would subject him to a competitive test. He was able to look at the subject from the standpoint of his customers, which is one of the fundamentals of business success.

It is the same way with figuring on a house or barn or any job. Keep the party interested in plans and total cost and good grades, etc. After all, cutting prices does not make business; but it is in having a living, breathing interest in the matter and making the prospective purchaser see that you have. In other words, use your personality fully, freely, but always fairly.

Using the Ton-Mile as a Basis for Cost Figures

COST figures, when properly compiled, furnish one of the only reliable bases from which to improve any service. Particularly is this true of transportation systems and delivery service. These figures must also be brought to the same level to be of any service for comparison.

This last statement, in itself, must be carefully considered, for it is common practice to make all sorts of comparisons, disregarding all the conditions surrounding the things to be compared.

The ton-mile and its different varied forms of which the package-mile, the M-foot-mile and the delivery-mile are but the more important, is but the result of getting a common basis for making comparisons.

Formulæ Which Form a Basis for the Calculation of Truck Mileage Costs

Full Load Basis

$$(1)\ \text{Miles per Trip} \times \text{total} \begin{array}{c}\text{Tons}\\ \text{(packages)}\\ \text{(M-feet)}\end{array} \text{per day} = \begin{array}{c}\text{Ton}\\ \text{(package)}\\ \text{(M-foot)}\end{array} \text{miles}$$

or

$$(2)\ \text{Miles per Day} \times \text{average} \begin{array}{c}\text{Tons}\\ \text{(packages)}\\ \text{(M-feet)}\end{array} \text{per trip} = \begin{array}{c}\text{Ton}\\ \text{(package)}\\ \text{(M-foot)}\end{array} \text{miles}$$

Half Load Basis

$$(3)\ \text{Miles per}\ \frac{\text{Trip} \times \text{total}}{2} \begin{array}{c}\text{Tons}\\ \text{(packages)}\\ \text{(M-feet)}\end{array} \text{per day} = \begin{array}{c}\text{Ton}\\ \text{(package)}\\ \text{(M-foot)}\end{array} \text{miles}$$

or

$$(4)\ \text{Miles per}\ \frac{\text{Day} \times \text{average}}{2} \begin{array}{c}\text{Tons}\\ \text{(packages)}\\ \text{(M-feet)}\end{array} \text{per trip} = \begin{array}{c}\text{Ton}\\ \text{(package)}\\ \text{(M-foot)}\end{array} \text{miles}$$

Fractional Load Basis

$$(5)\ \text{Miles per}\ \frac{\text{Trip} \times \text{total}}{\begin{array}{l}\text{Total} \div \text{loaded}\\ \text{Miles} \div \text{Miles}\end{array}} \begin{array}{c}\text{Tons}\\ \text{(packages)}\\ \text{(M-feet)}\end{array} \text{per day} = \begin{array}{c}\text{Ton}\\ \text{(package)}\\ \text{(M-foot)}\end{array} \text{miles}$$

$$(6)\ \text{Miles per}\ \frac{\text{Day} \times \text{average}}{\begin{array}{l}\text{Total} \div \text{loaded}\\ \text{Miles} \div \text{miles}\end{array}} \begin{array}{c}\text{Tons}\\ \text{(packages)}\\ \text{(M-feet)}\end{array} \text{per trip} = \begin{array}{c}\text{Ton}\\ \text{(package)}\\ \text{(M-foot)}\end{array} \text{miles}$$

Effect of Other Conditions

But again, it should be known and appreciated that when the ton-mile basis is attained it may be affected to a great extent by other conditions.

To illustrate: If the conditions surrounding a delivery employing two trucks of the same capacity are identical except in the number of miles which each travels, the ton-mile cost will not be the same. A table taken from standard cost figures will prove this.

Miles per day—	15	20	25	30	40	50	60
Cost per mile—	$.307	$.248	$.213	$.189	$.16	$.142	$.131
Cost. ton-mile—	$.204	$.165	$.142	$.126	$.106	$.094	$.087

From this table we can see that increasing the daily mileage in this case from 15 to 60 miles has reduced our ton-mile cost over 57 per cent. Of course there is a reason for this.

The Reason

Truck costs as generally figured are of two kinds: Fixed—those which must be paid every day, even if the truck stands idle all day; and Variable—those which depend on the work which the truck performs. The cost of any work performed by the trucks consists of the fixed and variable charges for the time required to do the work.

The fixed charge is the same regardless of mileage, so the fixed charge per mile will depend on the number of miles.

Suppose our fixed charge is $4.00 per day. Now, if our daily mileage is 20, our charge per mile will be $0.20, but if our mileage is 40 our charge per mile will be only $0.10. Let us assume our variable charge to be $0.07 per mile. Then in the two cases above we have a mileage charge of $0.27 and $0.17, respectively.

Relation of Miles and Ton-Miles

Through some misunderstanding, ton-miles are figured in almost as many ways as there are companies figuring, and it is our purpose to show the basis on which ton-miles must be figured to be correct.

Defined, a ton-mile is the carrying of one ton, one mile. Similarly, the package-mile is the carrying of a package one mile and the M-foot-mile is the carrying of M feet one mile.

Obviously, the ton-mile is the most convenient unit for the contractor, the coal dealer, or the miller; the package-mile is equally suited to the express company or the department store; while the lumber dealer will find the M-foot-mile of most use.

What a 5-Ton Truck Will Do

A five-ton truck loaded to capacity will accomplish five ton-miles in going one mile. Ton-miles then depend on the miles traveled and the load carried.

It is very essential to get the proper relation of these two items if we want a proper unit cost.

Some users have multiplied the miles traveled per day by the total weight in tons carried that day. This might be right if the truck made but one trip, but if more trips were made this result should be divided by the number of trips. Even this result represents the ideal condition and not an average one.

Three Hauling Conditions

There are at least three hauling conditions.

Carrying a capacity load the entire length of a round trip.

Carrying a capacity load to a given point and returning empty.

Carrying a capacity load out and returning with a partial load.

Starting with a capacity load and distributing it over the entire round trip may be considered in the second group.

Each of these conditions should be figured differently and we believe the following methods correct. The first we will call "full load" basis; the second, "half load" basis, and the third, "three-quarter or fractional" basis.

Figuring on Full Load Basis

In figuring on the "full load" basis, every mile of travel is represented by an actual load and so the cost can be equally

distributed over the entire mileage. On the "half load" basis only half the mileage is represented by a load, and so the loaded miles must pay for the empty miles.

Also on the "three-quarter or fractional" basis only a part of the entire miles traveled is represented by a capacity load and these empty miles must be paid for by the loaded miles.

A formula for figuring these conditions can be expressed in either of two ways. By trips we mean round trips.

A single example will prove that either formula will produce the same result.

A Good Example Proves the Result

A 1½-ton truck makes four trips a day; travels 60 miles and carries a capacity load both ways. How many ton-miles are represented?

The round trip distance equals 15 miles. Then by formula number (1) $15\ (\text{miles}) \times (4) \times (1.5\ \text{tons}) = 90$ ton-miles.

Let us suppose that this truck only carried a load one way. Now if we want to find the correct ton-miles we must use either formula 3 or 4. Using (3) we will get:

$$15 \div 2 \times (4 \times 1.5\ \text{tons}) = 45\ \text{ton-miles.}$$

It will be noted that this result is one-half that found under the "full load" basis. The ton-mile cost will be double that of the "full-load" basis and this is right, for the loaded miles must pay for the empty ones.

Again let us suppose that this same truck went out with a full load and returned with a half load. The correct ton-mileage can be found by the use of either formula (5) or (6). Using (6) the result will be:

$$60 \div 45 \times 1.5 = 67.5\ \text{ton-miles.}$$

Cost Per Ton-Mile

Figuring the cost per ton-mile is a simple matter when once the number of ton-miles is known, providing our costs are right. Costs, however, are not a part of this article.

The single statement that, if the daily cost and the ton-miles are known, simple division will give the ton-mile cost may be of interest in closing this article.—Sidney S. Merithew, in *"100 Per Cent Magazine."*

Why Should I Pay Myself a Salary?

By James H. Collins

ONE of the best selling stories used by a cash-register salesman is that of a retail merchant whom he frequently urged to install a cash register, doing away with loose change in his accessible money drawer.

This merchant was obstinate and went along without a cash register until he failed. When his business was sold it went to his chief clerk, who had pilfered enough money from the unguarded cash drawer to buy it. The merchant had to do something for a living. So he went to work for his old employee as clerk, and things ran on as before, without a cash register. Several years later there was a second failure, and this time the merchant bought in the business.

The experience taught him three things:

First: He did not hire that clerk again; second, he put in a cash register, and, third—but this was some time afterward, when the cash register began really to keep books for him and show him how the money came and also where it went—he began to pay himself a salary.

To-day, if the sheriff came in and sold out his business as a going concern, but left him what he has been able to set aside out of his profits for investment, he could retire very comfortably.

Some of the hardest workers in this world never draw any salary, and the strangest thing about their working without stated compensation is—they are all working for themselves! These workers are retail merchants, and farmers, and sometimes professional men, who put in long hours behind the counter, or in the cow-barn, or driving about visiting patients. In their absorption with the money that comes in for merchandise or cream or fees, and that which goes out for goods or labor or drugs, they entirely forget their own services, and never have a pay-day.

At the end of each year, if they strike a balance at all, and there happens to be two or three hundred dollars upon which they can lay hands, they buy some new clothes for the wife and children, or indulge in some other safe and sane spree, and then go back to drudgery without compensation, in the belief that they have made money.

Of course, if they were going to work for some one else, the question of salary would be the first essential discussed. And now, with the more scientific grasp of business that we are gaining, these unpaid workers are beginning to demand as much from themselves as they would from an employer. Moreover, if they don't, the first thing they know a government representative is likely to step in and ask them how much they pay themselves a week. And if they are not down on the books for a stated salary, and even if that salary is not large enough, the government may denounce them as pauper labor—plain "scabs."

It is doing something of that kind today in the baking business.

For years and years the little baker with a neighborhood trade has been working day and night without putting himself on the payroll. He had to pay his journeymen helpers, and his flour dealer, and the landlord, and everybody else. He paid them all so scrupulously that usually, when the receipted bills were filed, he had nothing left. But now the pressure of war has come upon the baker, little and big, with especial severity. He is asked to bake bread at the smallest reasonable margin of profit for the public good, and it is found that there is only one way in which he can do this—by strict systematizing of all his costs and accounting. The United States has lately stepped in through the Federal Trade Commission and investigated him for his own benefit.

One of the government investigators tells a story of a small neighborhood baker who was asked to put down on a blackboard every item of his costs in producing a loaf of bread, from the flour and fuel to the wrapping-paper and twine. When he finished the investigator took the chalk and wrote at the bottom of the list: "$18 a week."

"What's that for?" asked the little baker

"That's your salary," was the reply.

"Ho," laughed the little baker, "I do my own work!"

"Suppose you leave that item in, and pay yourself that much in cash every week, and see if you can make the business run just as smoothly," was the suggestion.

The little baker did this for three months, and at the end of that time had enough money to invest in a Liberty Bond.

But there had been changes in his other expenditures. To pay his own salary he had been compelled to locate and stop a dozen sorts of wastes, big and little, in materials, the time of his employees, and the like.

Usually that is where the salary of this kind of worker is going. The doctor who puts himself on the payroll has to systematize his practice and makes careless patients pay their bills. The farmer who makes his own weekly wages tangible in money discovers that he must get rid of a "boarder cow" that has been consuming more in feed than she gave in milk. The merchant finds that if he cannot make his own business hand out his payroll every Saturday night, it might be better for him to go to work for some one who can. The laborer is always worthy of his hire, no matter whom he works for.

If you work for yourself and do not receive your pay envelope regularly, strike until the boss puts you on the payroll!—*Every Week.*

How a Successful Country Lumber Dealer Handled One of the Most Vexing Problems of the Retailer

By Frank Kneisler

"THAT article by The Old Retailer in the November issue of BUILDING AGE about allowing discounts to contractors was sure a dinger; sound and sensible, and had all the earmarks of an old-timer with up-to-date ideas."

Meet Davy Jones, a big, jolly, rustling retail lumberman in a Western country town. You'll warm right up to Davy and like him great. It is refreshing to be around him and listen to him talk, for Davy Jones is endowed with a rare gift of saying a whole lot of humanly interesting things. He is about the one best specimen of pep and push and punch all splendidly blended in one man that I ever met. Of course, he is an eminent success. But he doesn't admit it. And that adds to the bigness of Davy Jones.

"We lumbermen bump up against some peculiar conditions"

"The Old Retailer evidently knows the ups and downs and the ins and outs of the country town lumber yard," continued Davy. "His ideas about allowing discounts to contractors are just about right—to my way of thinking. But he didn't say a word about another proposition that almost all country lumbermen have to deal with—this crime of paying commissions to carpenters. That is by far a worse feature to cope with than the matter of allowing discounts. I am very anxious to hear the experiences of The Old Retailer and how he dealt with this commission pest. That is one malady no country yard has always been immune from, for it is as contagious as gossip and certain as death."

And with this as a starter, Davy Jones proceeded to tell me a lot of interesting things about the retail lumber business in particular and other things in general. But I want you to hear him talk just now about discounts and commissions.

"We lumbermen bump up against some peculiar conditions at times. This retail lumber game isn't the softest snap in the business world, regardless of what the outsider says. We have our troubles the same as any other line of business. I fell heir to a nice little bunch of grief when I bought this yard four years ago.

"Both yards here for years had been allowing discounts and paying commissions to every hatchet and saw man who had a thing to do with the buying or handling of lumber. Allowing a discount to a legitimate contractor is all right and good business when handled in a businesslike manner. It is a well-established rule in buying that large quantities are bought for a closer price than small purchases. It should be so.

"A contractor buying large quantities of material, by the same rule is entitled to a better price than the occasional customer or the hatchet and saw carpenter who buys in small dribs. It costs just as much to sell a $25 bill of material as it does to sell a $1000 bill. And frequently I have found the small bills harder to sell and harder to collect. The average contractor with experience and ability to handle the larger jobs knows his requirements; has his material bill accurately and intelligently itemized, and can tell right off the bat what substitutions or changes the dealer may make.

"Nearly every bill of material of any great size the country dealer is called on to furnish he finds his stock short on some items, and it is a common thing to make a few minor changes in the original bill, to conform to the stock on hand—such as lengths or widths for instance. The better class of contractors know at once if such changes can be made and in most instances favor the lumberman in this way.

"In short the contractors are initiative, do business quicker, and otherwise are easier to deal with than the general run of small carpenters or the consumer. They are entitled to a discount. That's why both yards here allow discounts to the contractors.

"But this practice of paying commissions to the carpenters—that's the one nasty thing that gets my goat," continued Davy Jones, lighting his old corncob and squaring himself for a deadly attack at what he considered the worst evil of the retail lumber business.

"When I assumed charge of this yard I soon discovered that I had bought more than the real estate, the improvements, the stock, and the usual good will. My predecessor, having no further use for some of the prevailing customs of the yard, very kindly included them in the sale. And one of the customs he wished on me was the cussed thing of paying commissions to every jack-leg carpenter in the entire vicinity.

"I talked things over with my competitors"

"It's bad enough to have any grief at all, even though we might expect it and try to avoid it; but think of me actually buying it! In all my years in the lumber business the practice of paying commissions to carpenters was the one particular thing that I would never stand

for. And then I found myself confronted with the living fact that I had actually bought and paid good money for the very thing I had fought against!

"Nobody is to blame for such a foolish practice but the lumbermen themselves. Who ever heard of a grocer, or a butcher, or any other class of merchants paying a commission to effect a sale? Why should a lumberman allow commissions any more than any other fellow selling merchandise? Just as much lumber will be sold without paying commissions as there will be by paying them.

"In the first place the demand for any building material originates with the consumer. If some morning one of my customers decides to have his house reshingled and orders the material from me or engages a carpenter by the day or square to do the work, who created the demand, the carpenter or the owner? When the owner contracts with a carpenter to do the work the carpenter is supposed to—and does—arrange for the regular wage to be paid him. Then why should the lumberman be expected to chip in something extra to the carpenter?

"Why, when I first took charge here the carpenters had a habit of claiming commissions on the sale of every bill, even though the owner was furnishing the material. And the lumbermen were paying them, too. In fact, the yards were being run for the exclusive benefit of the carpenters.

"The whole scheme of paying commissions is positively wrong from stem to stern. There isn't one sound argument in its favor. When a lumberman allows a commission on a bill of material he is actually buying the sale by sharing his profit with the workman. It is nothing but a subterfuge used by lumbermen in a warfare of dirty competition. Moreover, the practice can never be intelligently and satisfactorily explained to the consumer. Any customer who is furnishing his own material has a perfectly good reason for looking upon the practice with deep suspicion, and it is wellnigh impossible to make him believe that the commission isn't coming out of his own pocket.

"An Ultimatum Was Delivered to Me"

"At least he is bound to believe that the margin of profit on the material was amply sufficient to justify the lumberman in rewarding the carpenter. None of us like to feel that we are paying an excessive profit or an unjust commission on what we buy, and this foolhardy thing of peddling rake-offs to workmen discourages building and discredits the lumber dealer."

"Well, Davy," I asked, "since you are so opposed to the evil of paying commissions, how do you and your competitor handle the local situation?"

"Simple enough," answered Davy. "After discovering what a mess I had got into I realized I had the choice of one of two things: Sell the yard and quit the town or keep the yard and abolish the custom of paying commissions. I chose the latter plan. So the first thing I did was to see my competitor and talk the situation over with him. He readily agreed with me that the practice was bad and was more than willing to put an end to it, but he feared to incur the ill will of the carpenters and lose their patronage and influence.

"'I believe we can explain the matter satisfactorily to the carpenters,' I said to him. 'The carpenters are not to be blamed for accepting commissions. It's certain they are going to accept their rake-offs so long as we offer them. They know the practice is unjust, but it isn't up to them to tell us to stop it. It is up to us to stop it. Maybe a few of them will sulk and kick over the traces at first, but sooner or later all of them will get back in the harness and adjust themselves to the right way of doing business.'

"So, from that meeting on, each of us told every carpenter about the new order of things. We made no exceptions among them and played no favorites. We told them in a nice unmistakable way that the custom was wrong and unprofitable and that we had mutually agreed to discontinue the practice. A few of them got a little sore at us, but we lost no appreciable amount of trade by reason of the change.

"'I can understand how it is possible for two yards in the same town to handle local conditions by mutual agreement and sticking by it, but what is to prevent your unfriendly carpenters from influencing a customer to trade at a nearby town where the lumberman dangles the same old commission bait for the carpenter's influence?' I asked Davy Jones.

"That very thing happened—or nearly happened—soon after we notified our carpenters. One of our carpenters who for years had made this yard his headquarters took very serious exceptions to our new rule and quit us cold. About two weeks later he walked into my office. His manner was very important. One of those fellows who feels he is the exceptional individual and has it sticking out all over him. He showed me a bill of material for an addition to a farmhouse about two miles from our town and something like four miles from a small neighbor town with a few stores and a lumber yard. I was soon informed that unless I allowed him a good commission the yard in the neighbor town would furnish the bill and give him a good commission.

"But I Sank the U-Boat and then We Had Peace"

"The owner of the country house was a very conscientious sort of a fellow; quiet and honest. He hadn't bought much material during the past few years, although what he had used always came from our yard. This same carpenter had done some work for him before. So I was told in a cold-blooded way just what I must do to sell this particular bill. He cared nothing about our new policy—that was for the other fellows. It was his business to look out for himself. After consuming my stock of kindly argument and decent treatment with no apparent effect, I ended the interview with this:

"'You go back to your farmer friend and tell him we refuse to pay you a commission on this sale. Then you tell him to buy his material at our neighbor town and haul it two miles farther. But be sure and tell him why you want him to buy it over there. Don't fail to tell him everything, for if he finds out you have deceived him you might lose his friendship and your job. I am telling you this as a friendly piece of advice, for I expect to drive out and see him to-day and tell him all the facts. Then I am going over and tell the lumberman in the other town what you have told me about his agreement to pay you a commission. This yard here has paid no commissions to carpenters since I assumed charge and it will never pay a commission so long as I have charge.'

"Well, sir; he didn't say a word, but stood there a minute, walked slowly toward the front door, hesitated, then left the office. But he came back in about ten minutes.

"'Davy, I've been thinking this thing over,' he began in a meek sort of a way. 'You fellows are right about cutting out commissions to carpenters. So, if it's all right with you, we will forget about our little argument and I'll tell Mr. ——— to start hauling material from your yard whenever he is ready. Now, this is about what he will need,' as he handed me the bill of material.

"So, after going through our little peace stunt, with a few exchanges of smiles and a cigar to him, he left."

"And did you sell the bill?" I asked.

"Sure, I did. That carpenter was bluffing all along. I knew the lumberman in the adjoining town hadn't promised him any commission, for the policy of paying commissions had been the very thing he was opposed to. The big commissions the yards here were paying had been pulling his own carpenters away from his yard, and it was welcome news to him to hear that we had put an end to the old system of things.

"So the yards here are selling just as much material now as they did under the former custom of giving away most of the profits as commissions."

And it seems to me that Davy Jones' plan is simple and sane and could be followed by other yards similarly afflicted.

AS SEEN BY THE MAN ON THE ROOF

CURIOSITY

"It is one of the regrets of my life," said Jones, "that I never studied for the clergy."

"Yes," replied Mrs. Jones, "a clergyman can do a great deal of good."

"Oh, it isn't that. But I have always had a curiosity to know how they button that kind of a collar, and still stick in the clergy."

SO WE HEAR

"I don't think that this war," said Binks decidedly, laying down his paper, "should be conducted on party lines."

"My goodness, no!" exclaimed Mrs. Binks. "Why the German spies would hear everything!"

SHORT

"That new stenographer," said the bookkeeper to the man at the next desk, "wears her skirt rather short, doesn't she?"

"Say," replied the man at the next desk, "all the good that skirt is to her is to prevent sore throat."

HAS THE DISPOSITION

"Don't you think that a Scotch collie has a wonderfully trustful look in its eyes?" said Miss Gush.

"Yes," said Jones, "and I don't see why it hasn't gone into the building and contracting business."

THE WEATHER VANE

A lot of these fellows with new-fangled ideas about religion, and government, and other things remind me of a weather-vane. They turn with every wind, and attract a good deal of attention gyrating around—but north is still north, and south, south.

SOME DO, AND SOME DON'T

"I suppose that most people want their building material on time," said the Sweet Young Thing.

"Well, not all of them," replied the Dealer. "A few pay cash."

STABS AND JABS

Talk about your repartee, we sure do have it at our boarding-house! Just this noon the mason's helper—who is a great little helper when it comes to helping himself—reached half way down the table and speared a slice of bread, took on a cargo of mashed potatoes with his spoon, and, pushing the butter-knife gently out of his way, uppercut the butter with his knife.

"Fine!" said the drygoods clerk. "What's the score?"

"What do you mean 'score'?" said the helper.

"Why, what are you doing?"

"What do you suppose I'm doing? I'm eating my dinner."

"Oh," said the clerk, "I thought you were having bayonet practice."

ON HIS BOOKS

Neighbor—"I see the building material dealer has been drafted. Do you suppose he will ever be able to carry a trench?"

Drummer—"He ought to be. For ten years now he has been carrying your whole town."

AND THEN COULDN'T COLLECT

Professor—"What is the first mention of a building material dealer in history?"

Student—"I don't know—but somebody put a lien on the tower of Pisa."

UNCERTAIN, COY AND HARD TO PLEASE

Visitor—"Do you have much trouble with the mail-order business in your town?"

Dealer—"No, most of our trouble comes from the female order business."

PUTTING THE BLAME WHERE THE BLAME BELONGS

"That last pound of nails I got from you," said the village carpenter to the general store man, "didn't seem to me to be full weight."

"Nope, probably not," replied the store man. "You see these gol-darned manufacturers now are skimping everything."

FOR MATERIAL

Neighbor—Milton says, "They also serve who only stand and wait."

Contractor—"Yes, and they keep on drawing pay while they do it."

ANOTHER IMPROVEMENT

Dealer's Wife—"I wonder why our little Johnny has been so good lately?"

Dealer—"I think he has been reading in Building Age about these metal shingles."

IT PAYS BETTER TO ADVERTISE

Browne—"If a man makes a better mousetrap than any other, though he have his house in a wilderness, the world will make a path to his door."

Greene—"Yes, but who wants to be in the mousetrap business all his life?"

QUITTING TIME

"Brother," asked the man with a tract solemnly, "will you be ready when Gabriel blows his horn?"

"Well," replied the mason's helper cheerfully, "I've never missed the six o'clock whistle so far."

TOO MUCH SO

"I see that Jones, the contractor, has failed in business. I thought he was very high in the estimation of his fellow citizens."

"Yes, he was very high."

JUST THE THING

"Can you send up some of that kindling like the last you furnished me?" telephoned the householder to his coal dealer.

"Certainly. Do you want to start your furnace?"

"No, I want to build a fireproof garage."

HORRORS OF WAR

Miriam—"Are you going around much this season?"

May—"No; there aren't enough boys to go around."

New Equipment That Will Interest Builders

A ONE and a Half Yard End Dump Hoist and Body, manufactured by the Archer Iron Works, 2451 West 34th Place, Chicago, Ill., is shown in Fig. 1. This outfit is said to be particularly adapted for use among contractors and building material men. The body is furnished complete with clamps, ready to be clipped onto the chassis. The body is 8 ft. long, 4 ft. 1 in. wide by 1 ft. 3 in. deep. It is equipped with a double operating tail gate with special slide gate arrangement in center. When the tail gate is let down and held by chains, it gives a total loading space of 9 ft. 3 in. The wooden side boards are removable. When attached, they give the body over 2 yd. capacity. The body and hoist are of steel construction throughout. It is said that one man can lift a load of 1½ to 2 tons in 45 seconds and return the body to its normal position by gravity in 5 to 10 seconds, thus enabling the operator to dump his entire load in less than one minute's time. The hoist is designed so that the body can be held stationary at any angle desired by a ratchet wheel.

Fig. 1—Archer 1½-Yard End Dump Hoist and Body

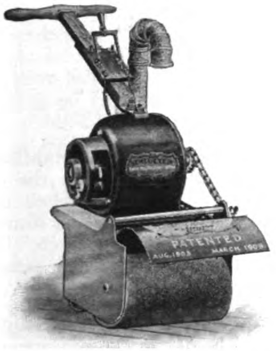


Fig. 2—Schlueter Floor Surfacer

A type of floor surfacer manufactured by M. L. Schlueter, 225-27 West Illinois Street, Chicago, Ill., is shown in Fig. 2. This machine is so constructed that it will surface close up to the baseboard or wall without the use of an edge roller. A special feature of the machine is that it does not require the use of levers. The machine moves forward automatically when the operator raises the handle. All parts on the machine are adjustable and may be placed without taking the machine apart. The machine consists of a steel frame, ball rockers, supported on a pair of truck wheels; a roller mounted in front, around which is fastened sandpaper or other abrasive material and revolved at about 700 rev. per minute; a motor mounted on the frame, taking electricity through a trailing wire from a nearby connection; exhaust fans mounted under steel frame to suck up the cuttings from the floor; and a handle and wheel brake gage in the rear to control the machine.

A type of bench planer manufactured by the J. P. Wallace Company, Chicago, Ill., is shown in Fig. 3. The machine is a portable power planer, driven by a direct connected motor which is totally inclosed, and is operated from an ordinary electric light socket. The cutting knives are 4 in. wide, the length of tables over all is 18 in., and the entire machine weighs 50 lb. with motor. Referring to Fig. 3, which shows the construction of the flap and shutter guard, A shows the flap, which is an aluminum casting swinging laterally over the tables, and covering the exposed part of the knives when narrow stock is planed. B shows the flap spring which holds the flap against the stock. C shows the shutter, which is a part of a steel tube rotating in grooves cut in the frame concentric with the cutter head, and covering the throat opening. The lip of the shutter rests on top of the front table until it is pushed by the stock around under the rear table. D shows the shutter spring, which snaps the shutter back over the knives when the cut is finished. It will be noted that the knives are entirely covered all the time, and that any kickback of the stock closes the shutter.

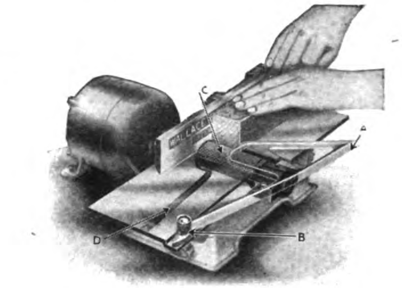


Fig. 3—Wallace Bench Planer

A type of collapsible parcel delivery box is shown in Fig. 4, the inventor being Henry J. Schlack, Architect, Otis bldg., Chicago, Ill. The box when not in use is folded up against the door. When the delivery man outside opens the door of the box, which has been cut into one of the panels of the kichen door, the box is raised into position and the parcel placed therein. The door is provided with a spring and locks automatically. The size of the box is 10 in. wide, 10 in. deep and 12 in. high. It is said that no special construction of the building or door is necessary, the box fitting any door.

Fig. 4—Schlack Collapsible Parcel Delivery Box

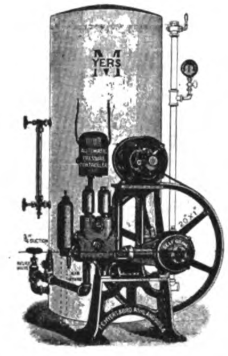


Fig. 5—Myers Electric House Pump

The Myers Electric House Pump, manufactured by the F. E. Myers & Bro., Ashland, Ohio, and designed for use with open or pressure tanks, is shown in Fig. 5. It is motor driven, and is designed for shallow wells or cisterns. The capacity is 180 gal. per hour. It can be operated by an electric current and from the farm lighting and power systems now on the market. The operation is automatically controlled by the use of the automatic pressure controller, which appeals to users generally as it is said to save electricity, wear and tear on the pump itself, besides saving time and labor in starting and stopping when water or pressure becomes low. All working parts

are automatically lubricated by oil splash from the crank case, thus eliminating frequent usage of an oil can.

A new type of handsaw has been brought out by Henry Disston & Sons, Philadelphia, Pa., and the novel arrangement of the teeth is shown in Fig. 6. The main purpose of this saw is to provide a tool which will combine the features of a crosscut and a rip saw. The Disston Double Duty Saw, as it is called, is especially adapted for use in general construction work of all kinds, studding up houses, shoring for sewers, making forms for concrete buildings, railroad work, farm use and all general purposes where it is handier to have one saw on the job rather than two saws. Referring to the illustration, it will be noted that the tooth-edge consists of a special combination of rip and crosscut teeth, each section separated by a deep gullet. When a saw is used for crosscutting, the rip teeth act as "cleaners," that is, clearing out the kerf. In ripping, there is double action, the crosscut teeth make a scoring cut on each side of the kerf, which enables the rip teeth to cut clean with greater ease and rapidity, not only in ripping but in cutting on an angle or diagonally.

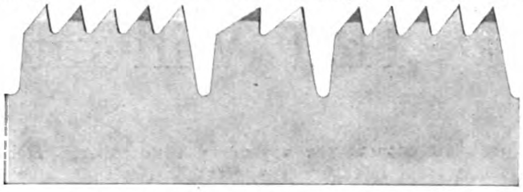


Fig. 6—Disston Double Duty Handsaw

New Catalogs of Interest to the Trade

Any of these catalogs will be furnished by the manufacturers. Or, if you prefer, we will see that you receive any that you desire. Just check the catalogs you want, tear out the page, and mail it to Building Age, 243 West 39th Street, New York.

Proven Specifications for Stucco on Metal Lath.—Published by the Bostwick Steel Lath Company, Niles, Ohio. Contains valuable information on this subject which will be of interest to the builder. The company is also publishing a booklet entitled "Bostwick Truss-Loop Metal Lath," which describes the various types of metal lath manufactured by this company, together with other interesting information. The company is prepared to furnish samples of various types of metal lath which it manufactures.

Natco on the Farm.—Published by the National Fireproofing Company, Pittsburgh, Pa. This booklet features farm buildings made of hollow tile. It shows many constructive details so that the builder can get a good idea of how the material is handled. Pictures of attractive dwellings built of hollow tile are also contained. This booklet will prove a valuable one to the builder interested in the subject.

Salt Glazed Brick.—Published by the Hocking Valley Fire Clay Company, Nelsonville, Ohio. Illustrates various shapes of brick manufactured by this company together with numerous buildings in which its products are used.

Pictures of Houses.—Published by the Creo-Dipt Company, Inc., North Tonawanda, N. Y. This is a series of pictures of attractive dwellings on which Creo-Dipt shingles were used.

Exhibit Sheets.—Published by Fords Porcelain Works, Perth Amboy, N. J. These exhibit sheets cover in a loose leaf form the various types of laundry trays, lavatories, toilets and baths, urinals and sinks manufactured by this company. Much interesting information concerning these subjects is contained therein.

How to Build a Modern Fireplace.—Published by the Stover Mfg. Company. This is a folder giving various items of information concerning the building of fireplaces. Combination dome dampers, throats, etc., are illustrated. A few of the types of andirons manufactured by this company are also pictured.

"Crescent" Wood-Working Machinery. Published by the Crescent Machine Co., Leetonia, Ohio. Illustrates and describes the various kinds of wood-working machinery manufactured by this company. New features recently brought out and illustrated in this catalog include a cut-off table, spreader on saw tables, hinged guards for band saws, 40-in. angle band saw, direct motor drive for planers and jointers, belt-guard for swing cut-off saws.

A New Steel Sash Operator. Folder published by the Detroit Steel Products Company, 2250 East Grand Boulevard, Detroit, Mich. Illustrates and describes a sash operator designed to open windows wide. It is built for use with either pivoted or top hung continuous sash in vertical or sloping planes.

Building Cities for a Million Soldiers. Published by the C. H. & E. Manufacturing Co., Inc., 330 Mineral Street, Milwaukee, Wis. Tells of the manner in which portable saw rigs manufactured by this company were used in building the cantonment. Illustrations show the machines on the job.

Steel Lockers. Published by the Hart & Hutchinson Co., New Britain, Conn. Describes and illustrates various types of lockers.

Milcor Barn Batten. Published by the Milwaukee Corrugating Company, Milwaukee, Wis. A post card folder describing galvanized steel batten strips.

Expanded Metal Construction. Published by the Northwestern Expanded Metal Company, 904 Old Colony Building, Chicago, Ill. A monthly containing illustrations of various structures in which Expanded Metal has been used.

The Pedestal Pile. Published by the MacArthur Concrete Pile & Foundation Company, New York City. Describes and illustrates the pedestal pile, and gives interesting data upon piles.

Wire Lath. Published by the Wright Wire Company, Worcester, Mass. Illustrates various types of wire lathing manufactured by this concern, together with interesting data thereon.

Pyrobar Reinforced Long Span Roof Tile. Published by the United States Gypsum Company, 205 West Monroe Street, Chicago, Ill. Describes tile made of Structolite, which is stated to be a specially prepared gypsum product, applicable to any building construction involving the principles employed in reinforced concrete design.

Fli-Bac. Published by the Empire Rolling Screen Co., Inc., Rochester, N. Y. Describes and illustrates features of the Fli-Bac screen, which rolls up or down so that it can easily be gotten out of the way if necessary.

Concrete for Beauty, Adaptability and Permanence. Published by the Helm Brick Machine Co., 492 Mitchell Street, Cadillac, Mich. Describes and illustrates machines for making concrete blocks. Various styles of blocks and details of construction are given.

"Superior" Metal Corner Bead. Published by the Milwaukee Corrugating Co., Milwaukee, Wis. Folder describing the merits of metal corner beads.

One Hundred Years of Progress. Published by the Gilbert & Bennett Mfg. Company, Chicago, Ill. This tells the progress of wire cloth weaving and points out various features which this company was the first to produce.

More Beaver Board Is Going to the Farm. Published by the Beaver Board Companies, 15 Beaver Road, Buffalo, New York. An illustrated circular which points out the advantages of selling Beaver Board to the farmer.

Builders' Hardware. Published by the National Mfg. Company, Sterling, Ill. An illustrated catalog showing various types of builders' hardware manufactured by this company.

National Builder's Hardware will help you please your customers---

EQUIP the garages you build this spring with National Fittings! Doors equipped with National Products are sure to give your customers satisfaction at all times. They have many advantages over doors hung with the hanger and rail equipment.

They cost less, are close fitting, weather proof and are at all times easily operated.

THE NATIONAL is absolutely the easiest working garage door set, as there is no binding or friction. They are guaranteed to work freely.

Doors hung with these sets require but a minimum of space in opening, as they are hung on the inside and fold and slide against inner wall.

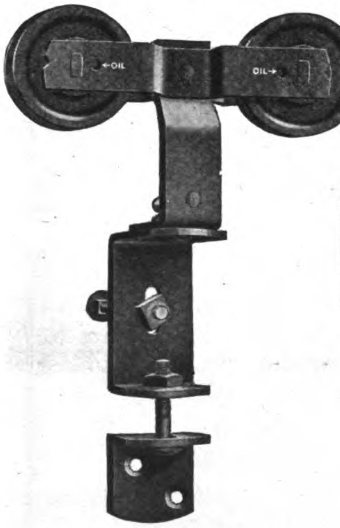
It is the cheapest and most substantial set you can offer your customer.

One Door Opens without Disturbing the Others.

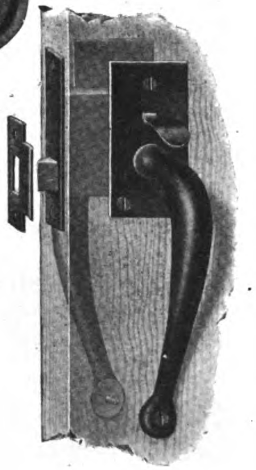
THE PRICE is within everybody's reach and there is a liberal profit in them for you, Mr. Builder.

Send for our new 1918 Catalog and give dealer's name.

NATIONAL MANUFACTURING COMPANY
Sterling, Illinois

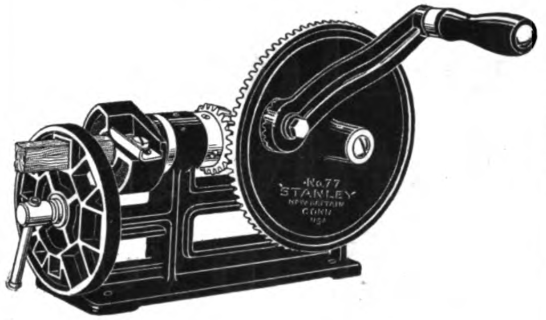


The Hanger operates on a swivel and turns on the track without sticking or binding in any way



The No. 27 Latch has no complicated parts to get out of order

Stanley Tools



STANLEY
Dowel and Rod Turning Machine
NO. 77

A tool for Carpenters, Cabinet Makers, Pattern Makers, Furniture Manufacturers—in fact, for anyone interested in woodworking.

It will not only cut dowels of varying sizes and lengths to perfect dimensions, but with it one can also form rods of practically any length.

Ready made or stock dowels have a tendency to warp and shrink, making them very unsatisfactory to use where a close fit is desired.

With this machine the workman can cut his dowels when he is ready to use them and, furthermore, of the same material as the wood being worked.

One cutter head complete for making dowels or rods ⅜ inch in diameter is furnished with each machine.

Additional cutter heads with cutters ¼, 5/16, 7/16, ½, 9/16, ⅝, 11/16 and ¾ inches can be furnished if desired.

A workman whose tool equipment includes one of these machines and a Stanley Doweling Jig can make doweled joints with surprising quickness and accuracy.

Price, with ⅜ inch cutter head, **$8.50.**
Additional cutter heads, **80c** each.

Call at your hardware dealer's and ask to see this machine. Manufactured by

STANLEY RULE & LEVEL CO.
NEW BRITAIN, CONN. U.S.A.

"YANKEE"
Plain Screw Drivers
STANDARD No. 90
CABINET No. 95

They cannot loosen in the handle, in use or abuse.

You have our Guarantee.

They are durable as the high grade steel that composes them, and will render faithful service for generations. The comfortable handle and various lengths of blade make them suitable for all classes of work.

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G. & H. Barnett Company
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Owned and Operated by Nicholson File Company

BUILDING AGE
New York, April, 1918

A Home of Unusual Plan and Design Built at Mamaroneck, N. Y.

ODD, yet decidedly interesting, is the Safford residence, built at Mamaroneck, N. Y. The porch at the left, octagonal in plan, forms one of the most unusual features of the design. The well proportioned porch columns carry plates which support rafters radiating from a common center. The porch communicates with the interior of the house by means of French windows. Flower boxes, placed between each pair of columns add much to the appearance of the house in summer.

The arrangement of the balcony over the front entrance door is also interesting. Although it is simple in design, yet the combination of balcony, brackets supporting the overhang, and well-scaled windows on each side of the entrance

The Back of the House

The Front of the House is Odd, Yet Decidedly Interesting

All Second Story Rooms Open on a Balcony around the Open Stairwell

A Massive Fireplace is the Predominating Feature of the Left Side of the Living Room. At the Left is Shown the Dining Room

The Living Room. A Beamed Ceiling Gives an Appearance of Massive Strength

door all help to make the entrance an inviting one.

The exterior of the house is covered with wide clapboards painted a pale yellow. The blinds, which are of the old-fashioned Colonial type, are painted green. The roof is likewise painted green. This color scheme is decidedly unusual, and yet the hues shade into each other in a manner which is decidedly interesting and attractive.

The foundation walls and chimneys are built of fieldstone.

The interior of the house is even more striking than the exterior. Entrance is had directly into the living room, or what might better be called a reception hall. A massive fireplace is the predominating feature of this section. The rough stone of which it is composed harmonizes excellently with the spaciousness of the reception hall. The stairs to the second story go up at the right side of the fireplace, turn to the left in back of it and then proceed straight up to a kind of balcony which runs all around the stair well. This open stair well gives an unusual sense of spaciousness to the reception hall. Its striking appearance can readily be seen from the half-tone illustrations which are presented in connection with this article.

The main part of the living room is to the right of the reception hall, and is semi-separated from it by columns and railings which are placed at the right of the stairs. The ceiling here, as in the other sections of the house, is beamed, thus being in keeping with the general massive appearance of the first story.

To the left of the reception hall is the dining room, which contains a large stone fireplace, similar in design to that in the reception hall.

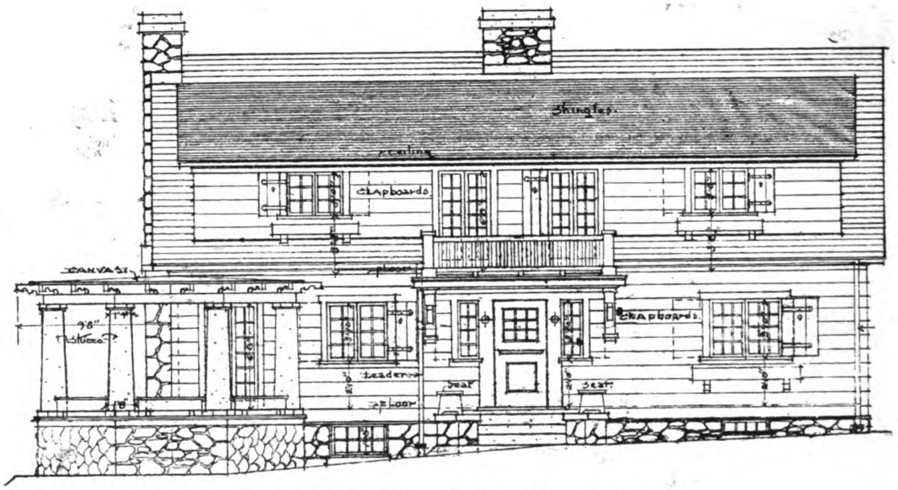
A connecting hall, or pantry, communicates with the living room, dining room, dining porch, and kitchen, as shown in the accompanying floor plans. A maid's room is located next to the kitchen, thus keeping the service portion of the house entirely separate from the other part.

The second floor contains four bed rooms, bath room, and a store closet. All these rooms open into the balcony, which is at the second story level of the stair well.

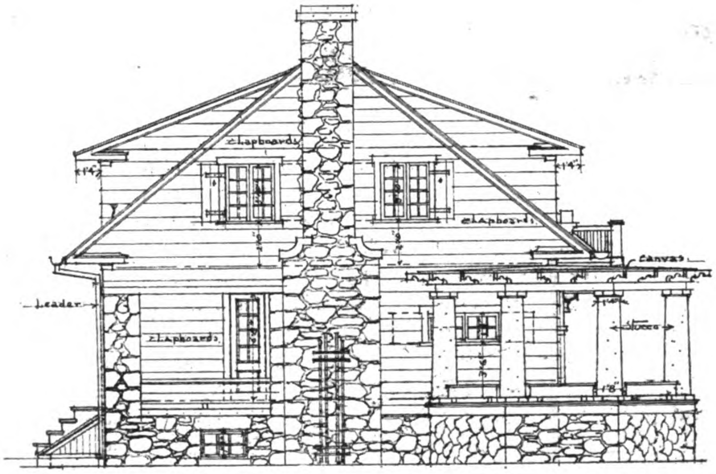
The bath room is located directly over the kitchen, thus rendering the plumbing system extremely economical.

The dwelling is heated by hot water. Electric lights are used throughout. This residence is located on Shore Acres Drive, Mamaroneck, N. Y., and was constructed for the occupancy of Mr. J. H. Safford, in accordance with plans and specifications prepared by W. S. Moore, architect, 30 East 42d Street, New York City. The contracting builder was Joseph Mulholland, Lawton Street, New Rochelle, N. Y.

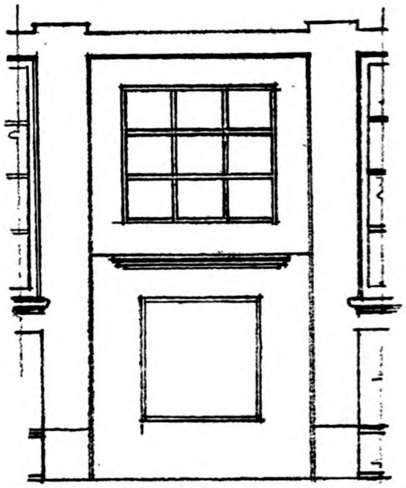
The Dining Porch



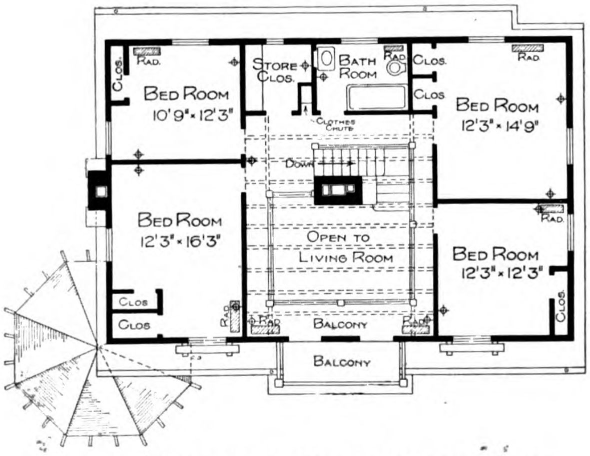
Front Elevation. Scale 3/32" = 1 ft.



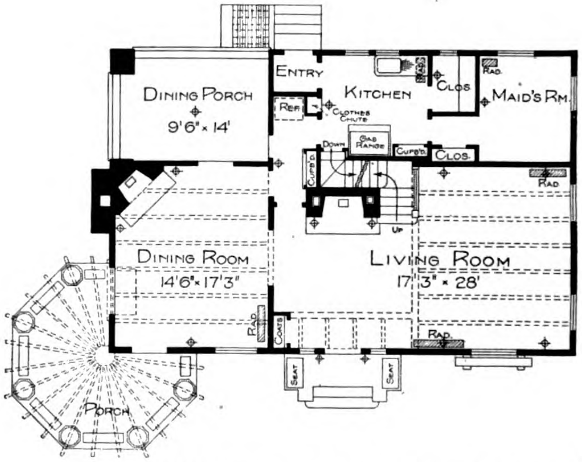
Left Side Elevation. Scale 3/32" = 1 ft.



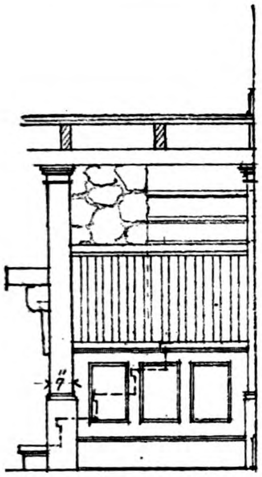
Elevation of Front Entrance Door. Scale ⅜" = 1 ft.



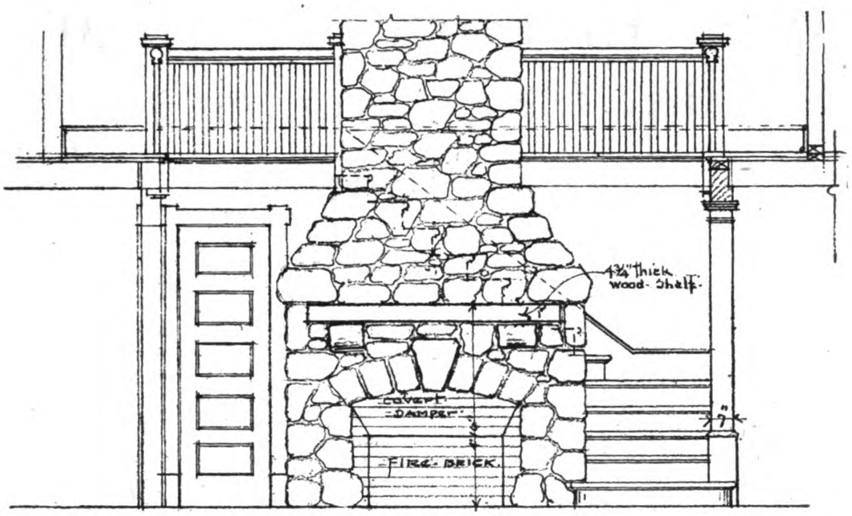
Second Floor Plan. Scale 1/16" = 1 ft.



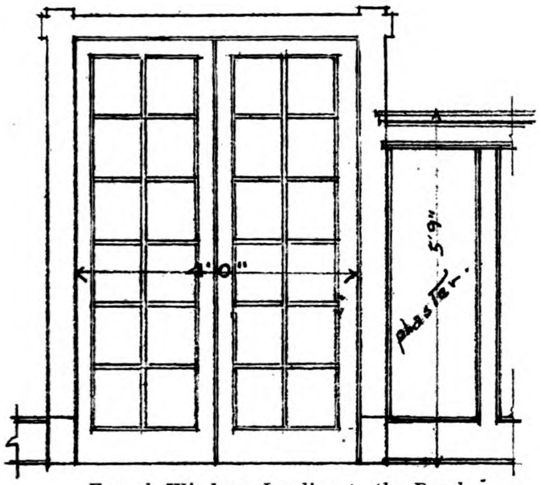
First Floor Plan. Scale 1/16" = 1 ft.



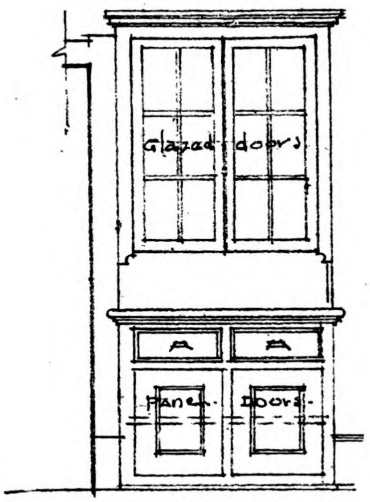
Elevation of Stair Paneling as It Appears From the Living Room. Scale ¼" = 1 ft.



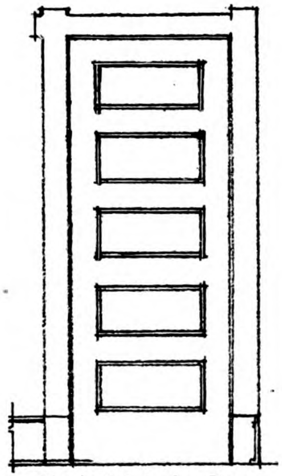
Elevation of Fireplace and Stairs. Scale ¼" = 1 ft.



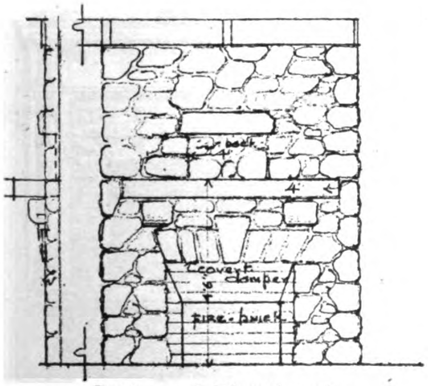
French Windows Leading to the Porch. Scale ⅜" = 1 ft.



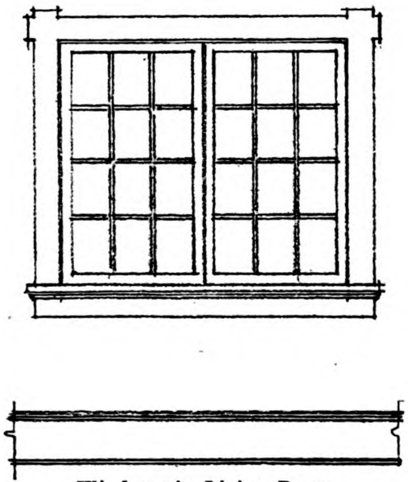
Cupboard in Pantry. Scale ⅜" = 1 ft.



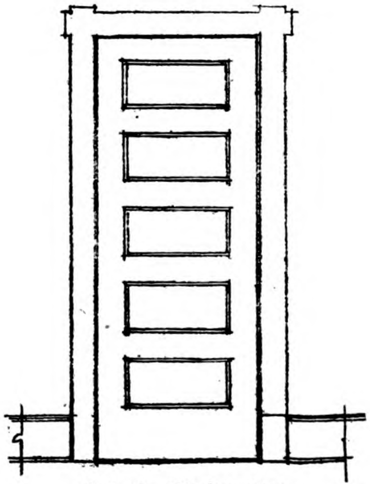
Typical Interior Door. Scale ⅜" = 1 ft.



Section and Elevation of Dining Room Fireplace. Scale ¼" = 1 ft.



Windows in Living Room. Scale ⅜" = 1 ft.



Outside Kitchen Door. Scale ⅜" = 1 ft.

Built-In Furniture That Adds Convenience to the Home

By Paul D. Otter

OUR present day mode of living naturally molds our minds to reducing space, with a consequent reduction of labor. Not to say the home idea is losing ground—far from it—but that with the demand of living a broad and helpful life outside in the many lines of interest calling us, we must reduce the domestic burdens as much as possible, and, as it were, run in light harness.

Building in many features of comfort and utility in place of the heretofore portable pieces of furniture has lightened the daily task of the housekeeper greatly. It will be found, however, in considering the subject of condensation that it is a matter not altogether of building in but quite as much of building out, filling in, and oftentimes attaching, in expanding—if you will—within a certain given space.

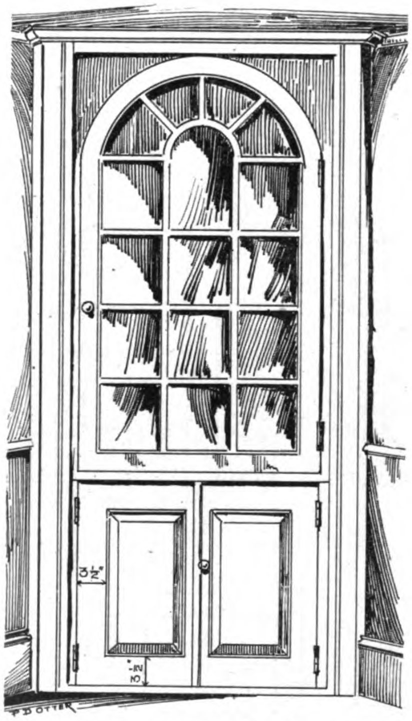


Fig. 1—A Corner Cupboard

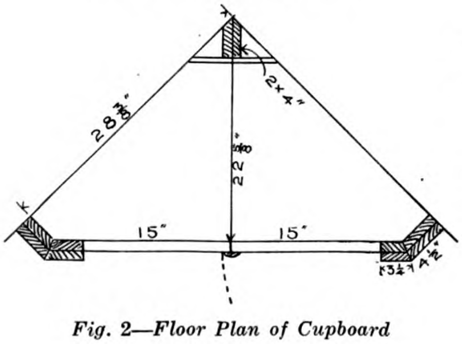


Fig. 2—Floor Plan of Cupboard

History is in the making very rapidly these days, and it will be found that our homes from now on will undoubtedly show the influence of war conditions. On the one hand the small family will reduce and move into smaller and less expensive quarters, while the large and scattered dependent members of families will show a disposition to join forces and fortune in living together awaiting the day of peace and reconstruction; either necessity brings about the built-in or built-out idea of concentration more forcibly.

The usual type of modern dwelling, more or less rectangular in exterior, and square in room plan, with thin walls, devoid of deep window sills, jambs or recesses, gives little encouragement or reason for building in. Rather does it suggest how to add to, or utilize the useless turn of a corner for the placing of a cupboard.

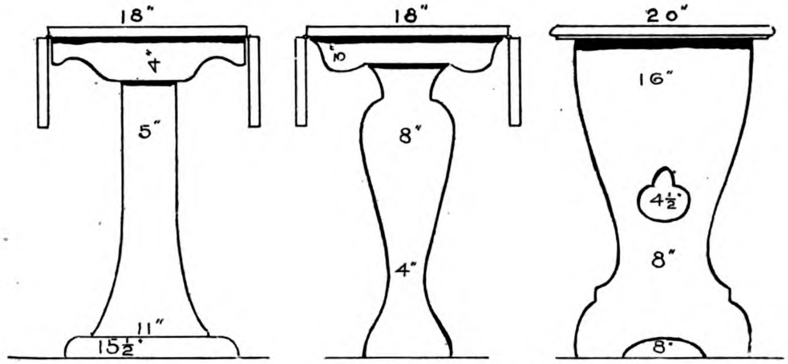
Fig. 4—A Breakfast Booth

Fig. 1 calls to mind the Colonial cupboard, which for various good reasons is being reinstated. If for no other reason, it helps to break the monotony of four corners and four straight walls. Admittedly its usefulness exceeds that of a portable china cabinet. This subject must necessarily be one of suggestion—intimating a possible application—adapting an idea to meet individual needs. It can therefore deal only with a few certain phases as given in the sketches. Centering a 2-in. x 4-in. in the corner from floor to ceiling, and facing it with suitable thin material in front of a 1-in. flooring, as shown in Fig. 2, makes a good beginning to setting in the door trim in harmony with the trim and moulding in the room—whatever is done make it a part of the house, not a part of your furniture.

The glass door in Fig. 1 is one of many forms which could be used, or one as shown in Fig. 12, having a blank panel

Fig. 3—A Fireside Settle

back of the upper three part arching, which would hide more or less dead space where a room has an unusually high ceiling.



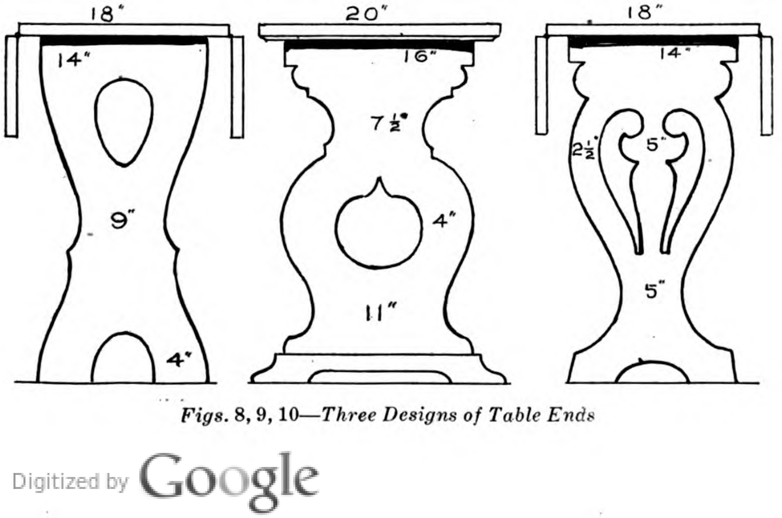
Figs. 5, 6, 7—Some Designs of Table Ends

Another room corner can be used for a bookcase of quite similar type with a paneled door up to where knob is shown in Fig. 1, which swings out and down to writing desk height, supported by a bar pulled out from underneath, or by a desk joint support—you will realize in this corner desk what a liberal writing bed you will have. Above drop front quite a library can be accommodated, while below desk bed the space is unusual. Properly, and most important, a corner near a window should be selected which would make the position of writing desk as desirable by day as by artificial light.

Whether the commuter and his wife evolved the "breakfast-in-the-kitchen" idea, "the breakfast booth" or the 'kitchen grille," to better conform to hurried breakfasts so that John could make the "6:30 a. m.," is not known. Whoever it was immediately started a good plan which is becoming very popular and helps greatly in saving wear on fine linen and the exertion to and from the dining room proper. In the small family and among grownups there are many reasons for installing a breakfast booth, or corner, for it has many uses after the meal hour; that of ironing table support, or a place where other meals may be prepared with more than usual comfort. Fig. 4 shows a booth or recess built out from side of kitchen for this purpose. Some kitchens may have a jamb or off-set which can readily be converted to this purpose, or if the room is quite large, a wall or screen may be set out into room, from floor to ceiling, thus forming a part enclosure.

Figs. 5, 6, 7, 8, 9 and 10 are given as suggestions to preparing an end support to table, the other end being securely screwed to cleat against window apron or wainscot rail at the table height of 30 in. The figures given on end drawings indicate inches in width to facilitate any enlarging desired. Tops should be 1 in. thick and for heavy top 1¼ in. thick with a cleat at top. The table top and benches may be any length desired from 42 in. and over; 42 in. will accommodate four people comfortably, facing each other. The top for a simple meal need only be 20 in. wide. Drop leaves on each side could give 8 or 12 in. more width.

The seat should be 18 in. from the floor and not less than 14 in. deep. If more room in alcove permits, make it 16 or 17 in. with back paneled on a chair slant for greater comfort. Should a table of a portable character be desired rather than have it fastened to the wall, two ends of a wider pattern should be used, such as Fig. 9, fitted with a foot piece 2 in. thick. With such a form of table the ends look better slanted, or battered at top, as shown in Fig. 11, with a simple strainer rail and apron. The forms herewith shown are largely of the Spanish and Italian styles, which are naturally attracting not so much attention from "allied" interests, but rather as a release from the over rigid Mission "Style" which has passed in favor.



Figs. 8, 9, 10—Three Designs of Table Ends

The location of the seat or settle should be influenced by a favorable position to window light and a four vista outside, or helping to form a cheery recess where a man can enjoy other reposeful thoughts which may draw his attention from the day's cares.

When building in or adding to, most careful consideration should be given to the proper and attractive location, else it will be as disappointing to a wife as are some houses rented by their husbands after nightfall. Fig. 3, while of a familiar form, will always appear well and is offered particularly as forming a good turn to the stairway from the back, and making, with a duplicate on opposite side, a very cosy alcove to foregather about the warmth of the fire and be under the cheer of the evening light. The dotted lines indicate back to be made with usual chair bevel and slant to deep seat, the seat to lift up to use under space for various purposes.

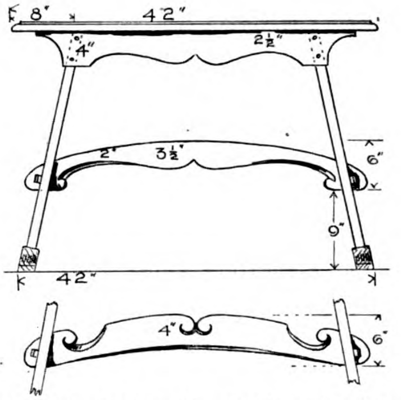


Fig. 11—Design Of a Table and a Pattern for a Strainer Rail

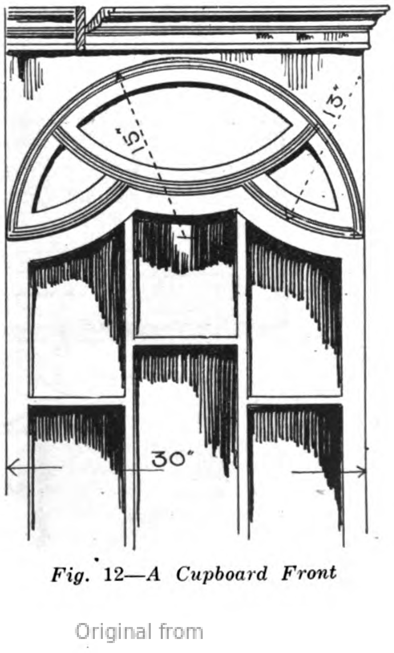


Fig. 12—A Cupboard Front

How to Build a Dairy Barn

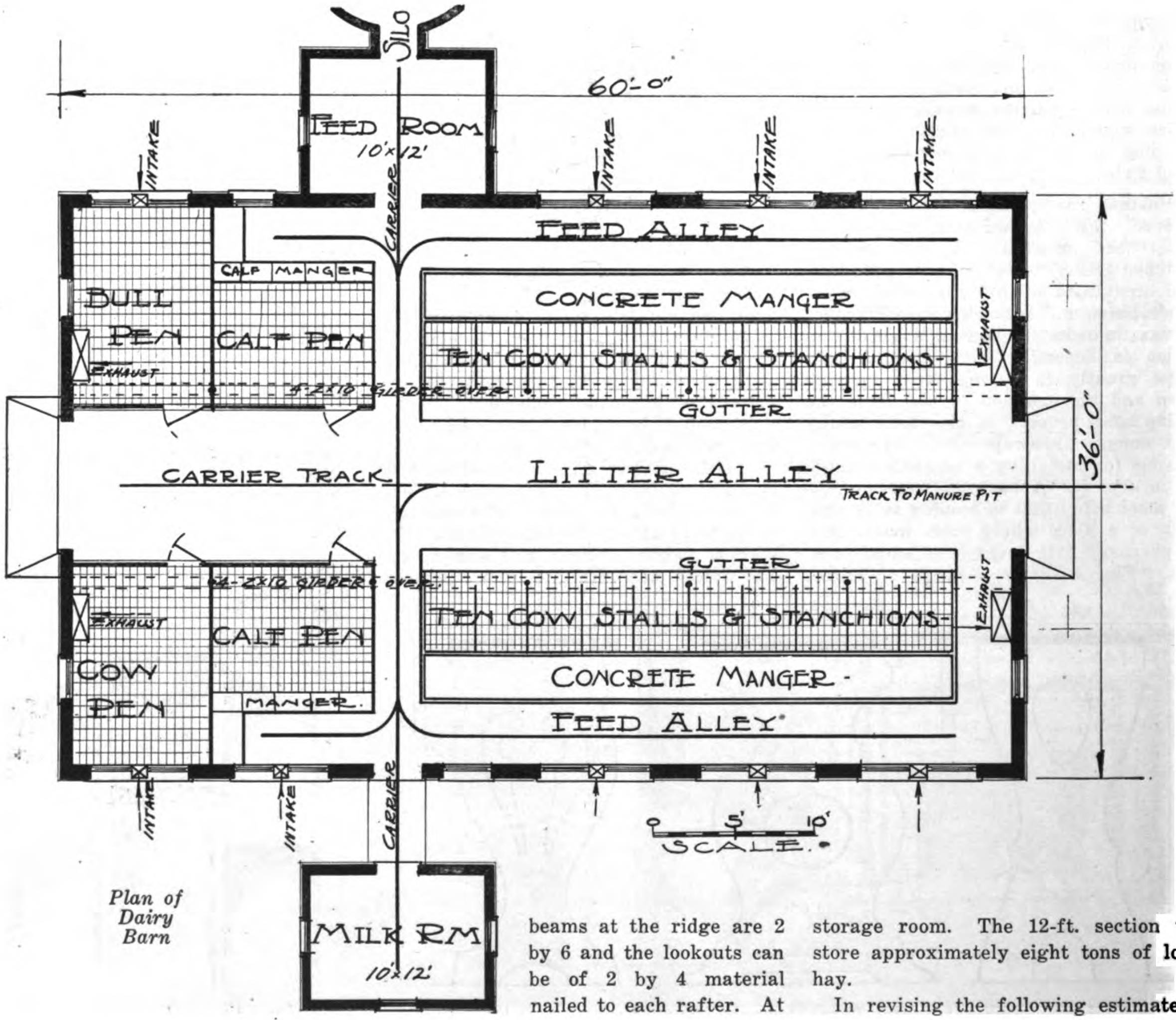
A Bill of Materials and General Specifications Afford Valuable Data for the Barn Builder

By W. E. Frudden

THIRTY-SIX feet is the best barn width for most all purposes where two rows of dairy cattle are to be housed. It makes a convenient arrangement for the first floor plan, and in the mow it means that the hay will need be moved but a short distance to the sides.

The following information will give a general idea as to amounts of materials required for any desired length of 36-ft. barns. Figures which follow are given for a barn only 12 ft. long. If a 60-ft. barn is to be built multiply these figures by five, and for a 72-ft. barn multiply by six and so on. Then add the materials for the sides the amounts as have been listed for the two ends of the barn, which is to be 36-ft. wide.

The general specifications of the modern barn follow herewith: The floors and footings are of concrete, with the walls above grade at least two feet so as to prevent rotting of the wood sills in case wood is used. The plan calls for hollow tile walls for the first floor up to the windows, which has proven to be a very satisfactory material for barn walls. The studding rafters, plates and sills are built out of 2 by 6-in. material. Joists are 2 by 10-in., and all framing lumber is spaced on 2-ft. centers. Collar beams at the ridge are 2 by 6 and the lookouts can be of 2 by 4 material nailed to each rafter. At the hip joints the rafters are double braced with 1 by 12-in. boards. The floor joists which support the hay mow are cross bridge in the center of each span and well lapped over the girders so as to make a continuous tie across the barn and thereby take up the outward thrust of the roof. The floor girders are made from four 10-in. planks spiked together and carried by 4-in. steel columns.



Plan of Dairy Barn

Where increased mow room is wanted the wall studding may be raised to a height of 8 ft. and braces tied from the plate to the floor. It will be found, however, in this unobstructed hay mow that there will be an abundance of hay storage room. The 12-ft. section will store approximately eight tons of loose hay.

In revising the following estimate of

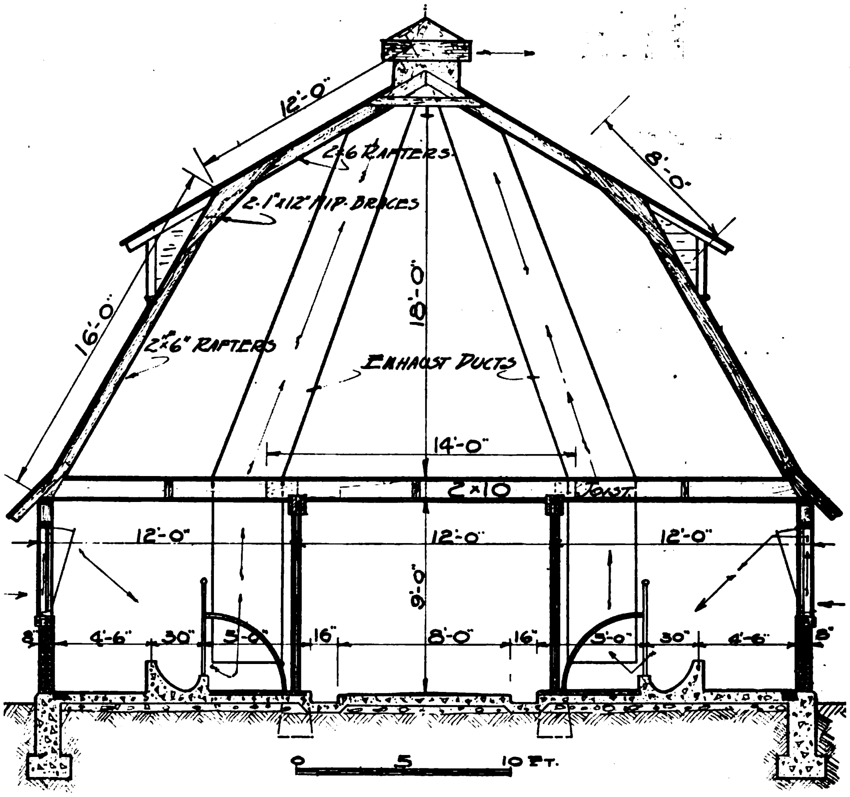
prices it is necessary to substitute the prices prevailing in your locality. This will afford reliable data.

MATERIALS AND ESTIMATES FOR A 12-FOOT SECTION OF BARN

4 yd. excavating, at	$0.35	$1.40
100 cu. ft. concrete foundation	.25	25.00
432 sq. ft. concrete floor.....	.10	43.20
24 lin. ft. concrete manger...	1.00	24.00
175 hollow clay tile for walls.	45.00	7.87
175 ft. side wall framing lumber.		
612 ft. mow floor framing lumber.		
850 ft. roof framing lumber.		
1637 ft. dimension lumber	26.00	42.00
150 ft. drop siding for walls..	45.00	6.75
750 ft. roof sheathing	23.00	17.25
7 M cedar shingles.........	3.75	26.25
525 ft. ship lap flooring......	30.00	15.75
576 ft. wall board lining.....	.03	17.28
Cost of materials for 12-ft. section		$226.75

MATERIALS AND ESTIMATE FOR THE TWO ENDS OF THE 36-FT. BARN

1150 ft. 2 x 6 framing lumber, at	$26.00	$29.90
1600 ft. drop siding for walls..	45.00	72.00
135 ft. (sq. ft.) wall board ins. lining	.03	4.05
290 cu. ft. concrete walls.....	.25	72.50
340 hollow clay tile for walls.	45.00	15.30
Cost of materials for two ends...		$193.75



Cross Section of Dairy Barn

Wall Board Construction for the Attic

By John Upton

THERE is a difference between Plaster Board and Wall Board in that Wall Board consists of several thicknesses of paper, while the Plaster Board is like a sandwich, paper and plaster.

In Wall Board we find widths of 32 and 36 in. Either may be used anywhere that lath and plaster would be used. As to which is the better or cheaper, it depends on circumstances. One thing in favor of the board is the fact that it can be applied by almost anyone, also there is no muss as there is with plaster. So for upper rooms which have not been finished it is ideal material.

A few words in regard to the use of this might be helpful. Let us take, for example, an attic of an old house. Supposing this room is low at the sides, as is usually the case. It may be well to make it two or three feet narrower on each side, so as to gain a higher side wall. Here is a chance for doing some figuring so as not to waste material. You may set the side walls in far enough so as to use one or one and one-half sheets for the sides and perhaps also for the slanting part on the rafters. You will want to put at least a four-inch base board around the room, so the wall board need not come quite to the floor. This will allow you to bring the side walls in a little further.

Having determined where the side walls are to go, the first step is to put down a 2 x 4 flatwise on the floor. This is to form a sill or sole plate on which to set the studding for the frame work of the sides. Next plumb up from this at each end and strike a line on the rafters. This is to be the center of a row of pieces of 2 x 4's cut to fit between the rafters and have their wide face flush and on a plane with the lower edge of the rafters. In other words, they have the same slant as the roof.

The next step will be to put in another row in the same manner with their centers at the joint of the collar beam and rafters. Then these should be marked off in sixteen inch spaces unless the rafters are so spaced. Studs of 2 x 4 or 1 x 4 are put in on sixteen inch centers from the sole plate up to this first line. These must have headers between them if there are to be joints on the sides in the wall board of the room.

If the rafters are sixteen inches apart it will not be necessary to put anything between them, but if pieces are put in they can be toenailed to the short 2 x 4's already placed.

For these pieces 1 x 4's could be used. If there are horizontal joints in this section, headers will be needed. If ceiling joists are needed where there are no rafters they can be cut on the slant and nailed to the short pieces of 2 x 4's. These should be 16 or 18 inches apart and there should be headers between them for all joints.

Another way of making a frame work for plaster board or wall board is to use narrow strips, say three inches, of dressed lumber. These, instead of being cut between the timbers already in place (or rafters, collar beams or joists), are nailed onto them to form a new surface. Short pieces are then cut and nailed between the new board.

In applying the wall board one should know whether the joints are to be pointed with mortar. If so, there should be one-fourth inch space left between them and joints broken. If they are to be covered with narrow strips of boards they should be kept in line. If they have cloth they should be close together and in line.

Large headed nails should be used for the fastening, put in about three inches apart all around and through the center. Scribe the first sheet to the wall and get it square and plumb and the rest will come in all right. Nail the center first to avoid trouble. The boards may be cut with a fine saw.

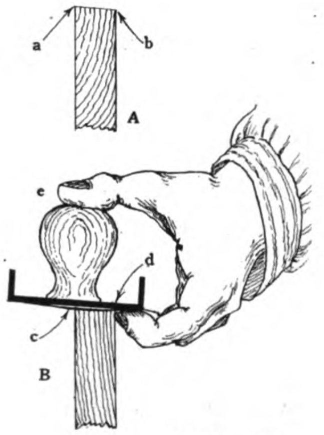
Hints on Making Glue Joints

Some Practical Kinks Which Will Help the Builder Who Does Much of This Kind of Work

By Charles A. King

LARGE factories have expensive equipments for making glue joints but job shops, school shops and home workers must make the joints and do the gluing with hand tools. The heaviest of the work may be done upon a buzz planer or jointer if available but the machine does not always leave the edges in shape to make a perfect joint, hence they must be finished by hand with a jointer plane. If a buzz planer is not available the edges must be roughly straightened by a jack plane before using the jointer plane.

The first step in making a glue joint is matching the grain of the boards and marking their edges so there will be no doubt as to the place of each; if the work is to be done by hand the second step is to see that the planes are in good condition; the iron of the jack plane should be ground quite rounding as shown in Fig. 1, and set to take a coarse shaving, the cap iron being set one-sixteenth of an inch or more from the cutting edge. The edge of the jointer should be almost imperceptibly rounding as in Fig. 2, even less than shown in the sketch, the middle third or half of the iron a b being straight, the corners at c d being ground slightly back beginning at a b, so there will be no danger of their cutting into the edge of the board being jointed. The cap iron and cutter of the jointer should be set for a rather coarse shaving in order to prepare the edge quickly for the finishing touches. Each joint should be roughly straightened with the jack plane and nearly finished with the jointer, after which the board should be laid aside until all edges to be jointed have been brought to this stage.



Figs. 3A and 3B

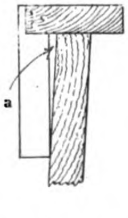


Fig. 4—Using a Try-square

In preparation for the final fitting of each joint, the cutter should be sharpened and with the cap iron adjusted to take a fine shaving in the exact center of the width of the face of the plane. If the edge of a board is square with its surfaces and but a thin shaving required to reduce a high place which prevents the edges from coming together and forming a perfect joint, the shaving should be cut by the middle of the iron. If the edge is out of square as at a b of Fig. 3A, the plane should be carried with the middle of the iron over the side of the board which is the higher, as at c of Fig. 3B, as the shaving will be thicker there and thinner at d, thus making the edge square if the shavings are removed judiciously; the thickness of the shaving is somewhat exaggerated in the sketch. Much depends upon the accuracy with which the plane is guided in doing this; the fingers should be held under the face of the plane, the fingernails just touching the surface of the board at d, the thumb upon the knob at e, the plane should be carried straight so its entire length will help in making the joint, while the cut is made in the center or upon either side of the cutter as may be required. If the motion of the plane is uncertain or "wobbly" the edge will be planned rounding in the thickness of the board, which will be difficult to remedy.

A skillful workman can tell from the "feel" of his plane if the cutter is adjusted correctly and cutting properly, or if the edge of the board is square with its sides. Generally a trysquare is used only as a guide in taking the last thin shavings; the cabinet maker's method of using this tool as shown in Fig. 4 may appear awkward to one who has never used it that way, but it multiplies the result of the test and is a real economy of time and labor. After the edges have been roughly straightened and squared they are ready for the finishing touches with a finely adjusted and sharpened jointer plane by one of the four methods commonly used.

Method 1, is usually applied in making long joints; the joint edge of the narrower piece a, Fig. 5, should first receive the finishing touches because it can be handled on and off the wider board b more easily than if the wider one had been done first. After planing this edge as accurately as possible lay the board a to one side, place the wider board b in the vise as shown in Fig. 5 and joint it. Place the narrower board a upon b, and if a is so narrow that it sags in the middle if held edgeways, the ends of the board should bear a very little harder than the middle; when tested laterally the resistance should be uniform at all points excepting the ends which should require a little more pressure to be moved sideways. The joint should be made this way because the ends of a board will shrink and swell more readily than the middle when exposed to differences of temperature or moisture, hence will be under greater strain. As the end is the weakest place in a glue joint, the joint will be more likely to open there if the closer contact at the ends did not in a measure relieve the tension.

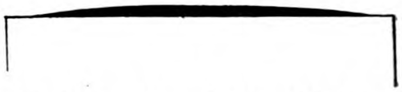


Fig. 1—The Iron of the Jack Plane Should be Ground this Shape

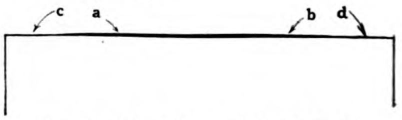


Fig. 2—The Edge of the Jointer

If the board is so wide it will not sag in the center when held edgewise, the joint may be fitted so the ends will support the board, the rest of the edge not touching the edge of the board upon

which it is resting. This space or joint between the boards should be tapered accurately from the middle of the joint to each end, but if the joint will easily admit the thickness of a piece of heavy paper in the middle it is too wide; a thin piece of paper should not pass freely more than two or three feet in the middle of a long joint, but if there is a slack place, even though it may be pressed by a clamp into perfect contact with the other board, it will cause a continual strain, as there will always be a tendency for the boards to pull apart, and sooner or later a sudden blow will cause the joint to open; in fact the joint must fit so well that it can be brought together by hand pressure.

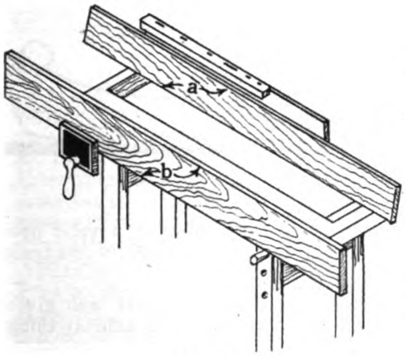


Fig. 5

Method 2. In gluing pieces of medium length, say 6 ft. or less, it is more economical of time to use the "try" method, in which the trysquare may be dispensed with, though many workmen prefer to use it in jointing the first edge. This is the method used in cabinet shops where often work of this sort is done in large quantities and the best results must be obtained in the minimum of time. The edge of the smaller piece must be jointed straight and the piece laid aside as in method 1; whether its edge is perfectly square is not important, but it must be straight. Place the wider piece in the vise, joint it straight and place the narrow piece upon it as in method 1, and if by good fortune the under piece has been accurately planed the joint will be fitted. If the joint is not perfect the high places may be located by moving either end of the upper board from side to side when it will swing as though pivoted upon the high place which holds it apart as at a of Fig. 6. The faces of the two boards should be tried at this time to be sure they are in the right relation to each other; often by using a slightly rounded plane cutter skillfully as in Fig. 3B all defects may be remedied the first time, and when the jointed edges are placed together, the lower one being held in the vise, the surfaces of both will be straight with each other, which is the final test of the accuracy of the joint.

Method 3 may be applied to short boards seven-eighths of an inch or less in thickness; the boards are placed together and jointed as one piece. Place the back sides together, their face sides out as at A of Fig. 7, the face marks at a. Be sure that the edge of the jointer iron is very nearly straight and plane the edges of both boards very slightly, hollowing lengthwise; the edges of boards described in methods 1, 2 and 3 will all appear the same when they are ready for the glue. It will not be necessary to use a trysquare in jointing by method 3, for if the jointed edges are not exactly square with the surfaces it will make no difference, as the angle at which the edges are planed will equalize each other and the face sides of the boards will be straight when the joint is finished, as at B. Usually this method is applied only upon short pieces, as more time may be wasted in correcting an inaccurate first attempt than in the other methods.

The above methods are ordinarily used in preparing boards for clamping together to hold them in place while the glue is setting. Often it is possible to glue a board 3 ft. or more long with one clamp across the center, the ends of the joint being held firmly together as the edges are slightly hollowed and the pressure in bringing the two edges into perfect contact their entire length will hold the ends so firmly in place that more clamps are unnecessary.

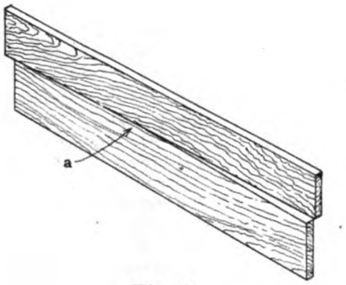


Fig. 6

Method 4. The rub joint is glued together without the use of clamps, and is much used in gluing small pieces, and pieces of such shape that it will be difficult to put clamps upon them. The edge of each board which forms the joint is jointed perfectly straight so the edges are in perfect contact their entire length. The lower board is held rigidly in a vise, the glue is applied to the edges, which are rubbed back and forth lengthwise upon each other until they are wood to wood. In making this joint much depends upon the boards being perfectly straight, both in length and thickness, as they cannot be sprung and held in place by pressure as in a clamped joint; if the boards are straight laterally, a joint of any length may be made.

Many cabinet makers claim that this joint properly made is stronger than a clamped joint because the rubbing process works the glue into the pores of the wood better than the straight pressure of clamps which forces the glue out of the joint rather than into the wood. In making glue joints, either of the first three may be made more economically than the rub joint and with more assurance of success, and may be reinforced with dowels, which is impossible in a rub joint.

An adequate discussion of the process of gluing would require more space than can be given at this time, but to touch the matter briefly, hot glue must be of about the consistency of thin cream; the edges of the boards should be warmed, and the gluing done in a warm room; shop glue rooms are kept constantly above 100 deg. F. The clamps, handscrews and all appliances necessary for the work in hand must be provided, adjusted and placed where they can be reached instantly, for after the workman has begun to spread the glue everything must move as rapidly as possible or the glue will chill; even the thinnest skin forming upon the surface of the glue after it has been spread will prevent it from entering the pores of the wood as it should, thus affecting the strength of the joint.

Within a minute from the time the first glue is spread the joint should be together and enough clamps in place to insure that it will not move; if cold glue is used a longer time will not have such a bad effect, but it is a mistake to think that cold glue can be used any way and still give satisfaction. While there is no doubt that the best hot glue properly used is superior to cold glue, the fact remains that unless hot glue can be skillfully used under favorable conditions, cold glue will generally give better results.

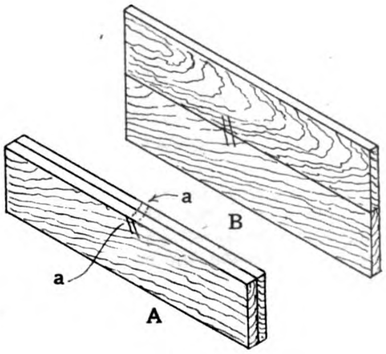


Fig. 7

Legal Department

The Question of Extra Work

ONE of the principal causes of disagreement between contractor and owners is the question of proper compensation for extra work.

There have been a great number of clauses for insertion in contracts involved by which it has been sought to control the problem of extra work and the amount which should be allowed for it.

Among clauses of this kind are those which:

1. Provide: Extra work shall be ordered in writing and that owners or engineer may alter, add to or make omissions to the work.
2. Provide: that the contractor shall be limited to the contract price and receive no further compensation for extra work.
3. Provide: that extra work shall only be done on written order, signed by the parties, and that the price shall be agreed upon and indorsed on the contract.
4. Provide: that extra work shall be only on written order and upon determination of price in advance.
5. Provide: if the parties are unable to reach an agreement as to extra work the contractor will not interfere with other parties to whom the work may be given.

Where clauses like the above are part of the contract, the contractor cannot recover for extra work done by him unless it is ordered as provided in the clause contained in his contract.

The fact that the owner has taken possession of the building containing the completed work will not change the situation.

If the extra work is done by the contractor in a case of this kind upon the assurance of an architect or engineer that his principal will pay for it and payment is not made on the claim that the provision of the contract as to extra work was not complied with, the contractor cannot recover the amount due him from the owner.

In a case of this kind, however, where an architect or engineer exceeds his authority or does something he has no right to do, the contractor may recover the amount due to him from the party who actually ordered the work to be done even though he personally may have received no benefit from it.

All readers are invited to ask any questions whose solution will help them solve any legal difficulty that they may be in. Our legal adviser, George Kaiser, will answer direct by mail and give his opinion as to the correct procedure. Such of the questions and answers as are of general interest to the trade will be published in these columns.

All inquiries must be accompanied by the name and address of the correspondent, so that he may be answered direct or that he may be requested for further information if necessary to the intelligent answering of his question. No names will be published, only initials or a nom de plume. Remember that this service is free to subscribers.

Address Legal Department, Building Age, 243 West 39th Street, New York City.

Unless an architect has authority under a contract to authorize work not provided for in the contract, or order materials not called for therein, he cannot make his employee liable for the charges even though he has authority to direct alterations, additions and charges.

Of course, contract stipulations may be modified or amended by subsequent agreements, but the subsequent agreements must be carefully made to be valid.

It has been held in New York that an owner may waive a provision of a contract requiring a written order and that the owner may do this by a verbal waiver.

The architect, however, not being one of the parties to the contract, has no authority to waive anything.

Where a contractor has received an irregular order for extra work and finds out after it has been completed that he will not be allowed for it he naturally tries to find some act or order which will amount to a ratification or a valid new agreement or a waiver of the contract terms.

Where the irregular order was given by the architect, this is a difficult thing to show.

Where it is given by the owner, oftentimes it is possible to do so.

It has been decided in a New York case that in a case of this kind there must be a waiver of each particular transaction. The Court, in that case, said:

"Even assuming that the contract provision was waived in the three previous transactions shown by the plaintiff, the waiver in each case would apply to the particular case only, since each related to an independent transaction. The defendant was at liberty to insist on strict compliance with the contract as to any future transactions of a similar nature. It may be that defendant's manager misled plaintiff into doing this extra work by promising to accept their proposal in the form and manner required by the contract, as some of the testimony suggests, but damages on that account may not be recovered in this suit."

Can Balance of Contract Price Be Secured When Minor Changes Are Made?

Suit for a balance claimed to be due under a contract which included plans, specifications, a building code, and public health laws of a city was instituted by a contractor in a late case.

The contractor admitted there were variations, changes and omissions, but claimed a waiver as to them on the owner's part.

The Court held, that although a building contractor is not held to a complete and specific performance of a contract in every detail where the cost of erecting a building is $5329, and where the cost of curing defects is $882, the contractor cannot be held to have substantially performed his contract and, therefore, cannot recover in view of violations of the building code and health laws.

Defects such as painting and papering of walls were held to not be substantial

defects, but defects such as failure to construct trimmer beams, defective condition of a staircase, failure to connect gutters on the house with the street sewers, and the lack of double beams under partitions were decided to be substantial defects.

Can Owner Secure Damages for Delay When Much Extra Work Is Ordered?

That, although a contract may provide that alterations in a building must be completed by October 1st, the owner cannot claim delay in completing the work where there is a considerable amount of extra work, the largest part of which is given out in October, is the decision in a recently reported case.

The Court held that there was a waiver as to the delay by the contractor because the extra work required the erection of an additional room on the roof of the building and the work originally contracted for could not be completed until the changes on the roof were made.

It was therefore decided that the owner was not entitled to damages for delay.

Law Providing that Judgment Cannot Be Obtained Against Soldiers and Sailors

A law of great importance to property owners, persons who have money out on mortgages, and merchants generally, is the Soldiers' and Sailors' Civil Rights bill which was approved by Congress March 4. It applies to those soldiers and sailors only whose normal ability to meet their obligations has been "materially affected" by their military service. Its form is very drastic and it has provided among other things that:

If soldiers and sailors are purchasing homes on the instalment plan, mortgages cannot be foreclosed if instalment payments are unpaid while they are away.

Mortgages on the business or stock in trade of soldiers and sailors cannot be foreclosed.

Dispossess proceedings cannot be brought against the dependents of soldiers and sailors if the rent is not paid while they are away in the service.

Creditors cannot obtain judgment against soldiers and sailors because they are absent from home.

The statute of limitations is suspended as regards suits by soldiers and sailors, no matter how long they are away in the service of the country.

The homes of soldiers and sailors cannot be levied upon to satisfy judgments entered before their departure.

Property belonging to soldiers and sailors cannot be sold for non-payment of taxes.

Insurance policies cannot be cancelled because of non-payment of premium.

Iowa, Maine, Maryland, Massachusetts, Oregon and Wisconsin passed similar laws last year.

When Printed and Written Clauses of Contract Conflict, Which Prevails?

From K. F., New Jersey.—When there is a written contract, part of which is written in ink on a printed form, and the printed part and the written part conflict—which is the one the courts will go by?

Answer.—Where the written and printed parts of a contract are opposed to each other in their provisions or effect—the written parts are always held to be controlling.

The reason for this is that the written parts are presumed to be the result of the deliberate expression of the parties' real intention, while the printed parts having been prepared without thought as to the particular contract over which the question arises is less likely to express their intention in that particular transaction.

Has This Builder Any Redress?

From N. B. P., Contractor and Builder, North Dakota.—I see by the last number of BUILDING AGE that the firm has established a Legal Department for the benefit of its subscribers. Having been a subscriber to the BUILDING AGE for a number of years, I am writing to you here about one little deal I had last fall.

A certain school board out in the country from here advertised for bids to build an area schoolhouse. They say there were three bids, but it so happened that my bid looked the best to them. There was some delay about getting the money to build with and, for that reason the board did not let the job until some ten or twelve days after they had opened the bid. I met members of the board in the meantime, some of them three or four times, and had some talk with them about cutting off some of the items which they did not need, so as to reduce the expense. One day, I met two of the board together here in town, one of them the president of the board. After asking me some questions as to when I could start and how much time I needed to do the job, they told me the job was mine and for me to get the contract written up and to bring it out to the house of the president as soon as I could. I agreed to do this, but I told them it would probably take the best part of two days before I could get it out, which they agreed to. I spent a good bit of my time writing up items that had to be included in the contract. I then hired a man to write it up in duplicates on a typewriter by a party who often does this kind of work for me.

I then hired an auto and driver to take me out to the home of the president several miles into the country. We arrived there within the time agreed upon, but there was no one at home. We then drove several miles further to his neighbors and relatives, including one other member of the board, to find him, but we did not find him until we returned to his house. It was then late in the evening, between 9 and 10 o'clock. He was home. I handed him the papers and also told him we had been there before. We three, himself, the driver and I, went into the house, sat down to the table, where there were eight. He read the papers all over very carefully; he made no remarks; everything seemed to be all right, but he said, "It's getting late. Suppose you leave these papers with me to-night. In the morning I will take the auto and go around and see the other members of the board, and the board will sign up, after which I will bring them to you in town and have them there by noon so you can sign up." I agreed to do this, and the driver and I went home. I have never seen the papers since. I waited two days and he did not show up. I then went out to his place to see what was the trouble. He told me he had not been to see the rest of the board, but he had talked to some of them over the 'phone. He refused to sign up. I did not get it out of him just what the trouble was, but I had heard before I got to his place that they were dickering with a man from Fargo, who afterward built the schoolhouse from $250 to $300 below my figure, but he failed to put in as much foundation as the board told me they wanted, by at least $25.

It appears the board had no bid or dealings with this Fargo man until after they told me to get the papers ready.

Now, it appears to me that I should be able to get some compensation for all the trouble and expense that I have been put to and perhaps also wages for myself for such time as I expected to work on the job, and also the contractor's profit.

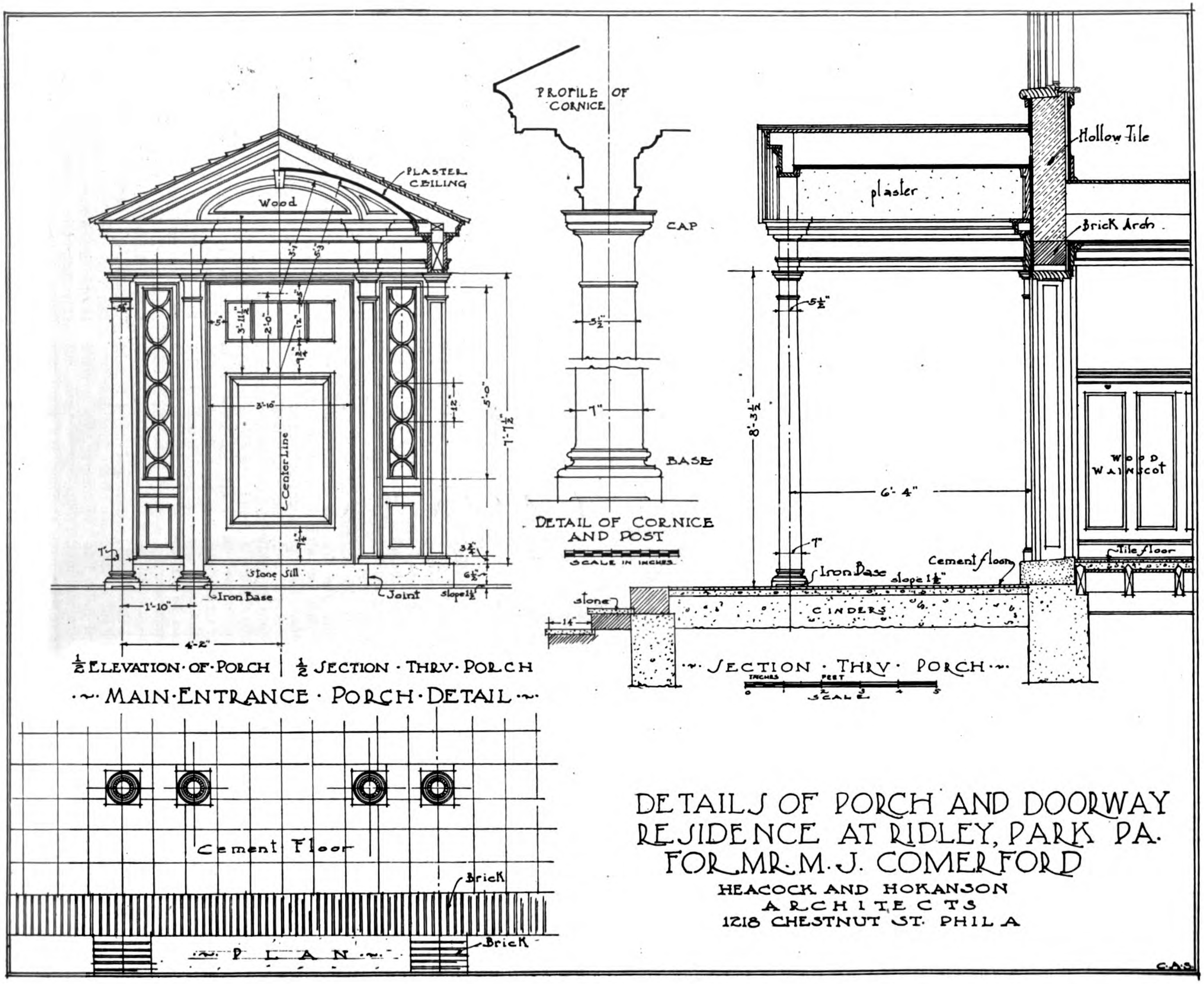
I would like your opinion on this matter; also the correct way to proceed.

I have tried to make this as clear as possible, and if there are some parts not clear enough, I will be pleased to write you further.

I will state here, that the day I met the two members of the board here in town when they told me the job was mine, happened to be on a Sunday.

Answer.—The whole question in your case is whether or not the conversation you had with the school board bound the members of it to let you go ahead with the work. Suppose after you had drawn up the contract you had been unable to agree with the members as to terms. In a case like that there would not have been any liability on their part for the expense you were put to in drafting the contract or in calling on them for a conference. I feel that although you have been put to an expense in this matter, you have no legal redress, as it does not seem as if there was a binding agreement between you.

Your case is like the case of an architect who submits plans to a builder. If the plans are not accepted, the time and expense put in on preparing them are a loss to the architect, and are not chargeable to the builder. Why don't you take this matter to some local attorney and see if he will take it up on a contingent basis—that is, on an agreement that he make no charge for his services if he is unsuccessful but that if he is successful he will be entitled to a percentage of the amount recovered.



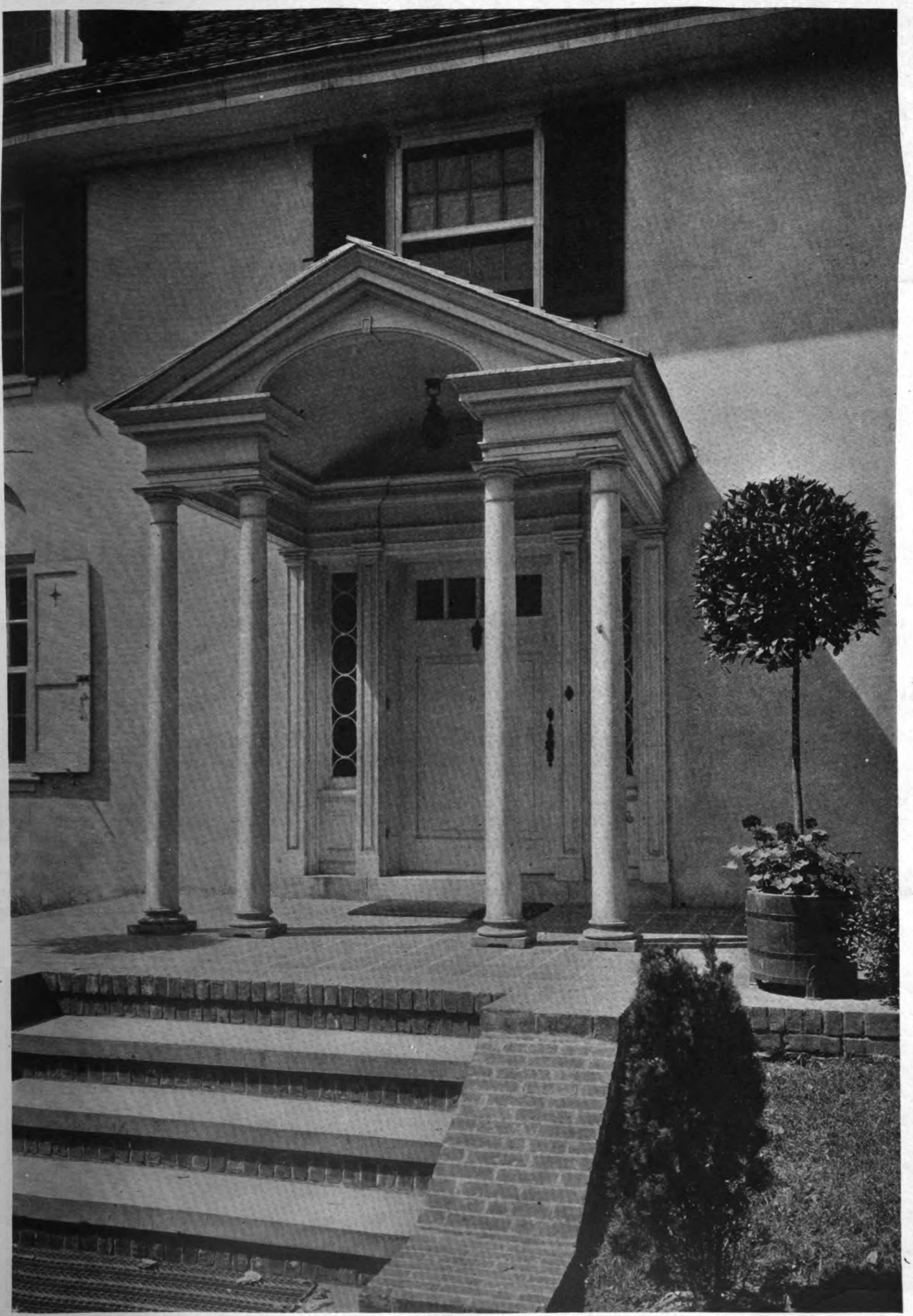
½ ELEVATION · OF · PORCH | ½ SECTION · THRU · PORCH

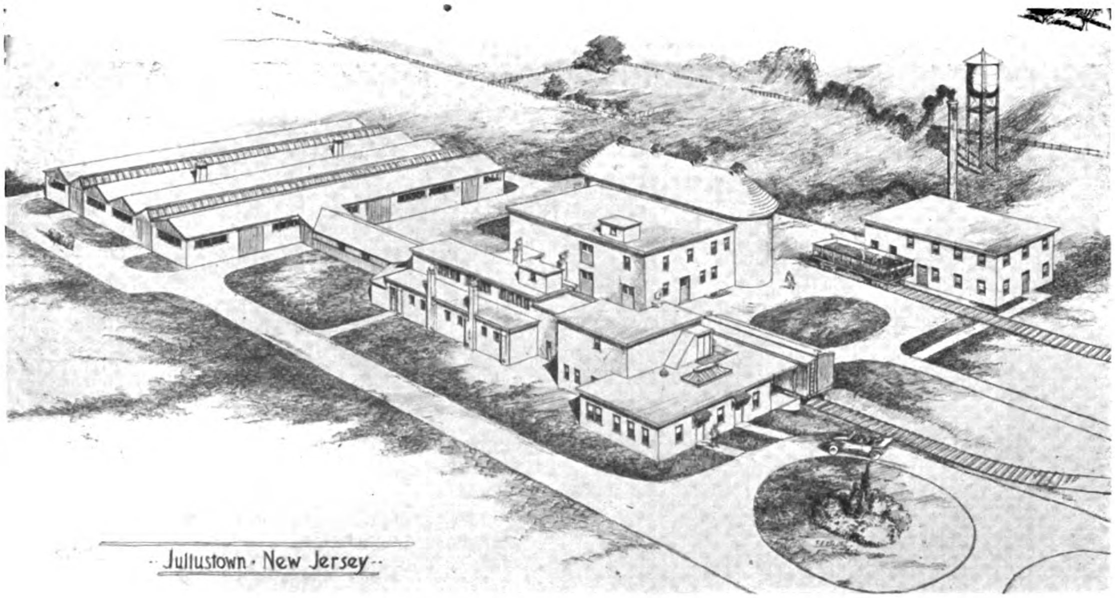
~ MAIN · ENTRANCE · PORCH · DETAIL ~

~ SECTION · THRU · PORCH ~

~ PLAN ~

DETAILS OF PORCH AND DOORWAY
RESIDENCE AT RIDLEY, PARK PA.
FOR MR. M. J. COMERFORD
HEACOCK AND HOKANSON
ARCHITECTS
1218 CHESTNUT ST. PHILA





Bird's Eye View of the Plant

A Milking Barn and Cow Shed Built at Juliustown, N. J.

The Concrete Walls are Hollow—Plans and Details in Accordance With Which the Buildings Were Constructed

An extensive dairy plant has recently been completed at Juliustown, N. J. There are five buildings in the group, comprising a cow shed, milk barn, store house, dairy barn, and power house. The buildings are of Van Guilder Double Wall concrete construction, having hollow walls.

The pitched roofs of the store house and cow shed are provided with 7-ply plastic slate and felt roofing with a sand finish felt top coating. Other roofs are of 5-ply tar and gravel Barrett specification roofing with white gravel.

All of the buildings are lighted by electricity. The necessary rooms in the dairy and power house are heated by steam radiators. Throughout the dairy, power house and in the cleaning room of the milking barn building there are McDaniels Tees supplying live steam, cold

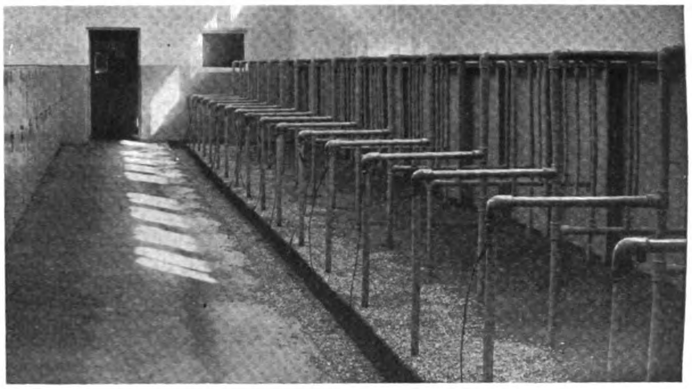
Interior View of Milking Barn

Interior of Cow Barn. There Are No Stalls in This Barn. 400 Cows Are Housed

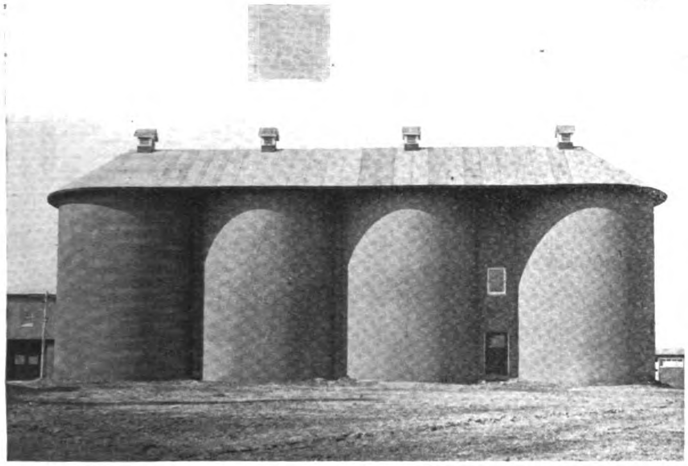
water or hot water as required at different points for washing down or sterilizing purposes. All places where necessary are properly drained with the best of plumbing.

The milking barn is approximately 46 x 71 ft. in ground plan and is divided longitudinally into three compartments, each containing 18 cow stalls and a passageway. The first compartment contains the cleaning room, the second the milking room, and the third a feeding room. The building has concrete floors throughout, together with feeding troughs, troughs and gutters for the cattle.

One of the features of the building is the arrangement of doors at the head of each stall, thus permitting a direct passage of cattle from one compartment into another. The interior walls are plastered with cement plaster either on the concrete walls or on metal lath. The finish is enamel finish throughout on both wood and plaster.



Stalls in Milking Barn



The Silos as They Appeared When Completed

The cleaning and feeding compartments are one story in height, with plenty of light from the sidewall windows.

The milking compartment, which is lighted from a Monitor roof, is ventilated and heated by means of an Ilg ventilating and heating system, which is installed in a pent house on the roof.

The feeding and cleaning compartments are ventilated by means of a King system of ventilation.

The cow shed has an area of 141 ft. x 160 ft. and is divided into 12 pens, properly fenced off with passageways, each pen approximately 30 x 50 ft. These pens are figured to accommodate 18 heads of cattle each, or a total of 216 cows. Each pen contains an automatic watering trough of concrete. The shed is connected by means of a covered passageway to the milking barn adjoining.

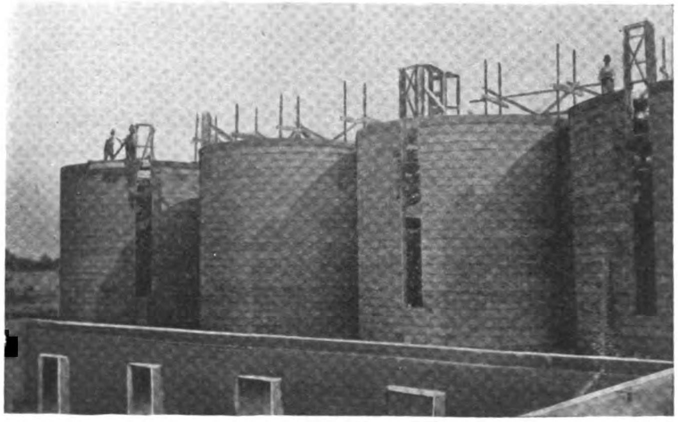
Framing timbers were of spruce. The truss members, girders, purlins and similar timbers are of Georgia Yellow Pine. Main plates are of 4 x 10 in. stuff bedded in cement and anchored with ⅝-in. bolts with heavy cast iron washers and spaced 4 ft. on centers.

Where walls were hollow the bolts were centered to be placed on each wall. The plates were halved and primed at angles. All interior stud partitions are 2 x 4 in. or 2 x 6 in. stuff spaced 16 in. on centers, doubled around all openings and at angles, and thoroughly trussed over all openings. Partitions were provided with a row of 2 x 4 in. cross-bridging cut in between the studs. Floor beams were doubled under all partitions running the same way. All beams and joists rest at least 4 in. on walls or bearings. Headers and trimmers are thoroughly strapped and spiked. Rafters are doubled at all roof openings. Ribbons are thoroughly secured to the girders. All floors are crossbridged with 2 x 3 in. stuff, each span being 10 ft. wide.

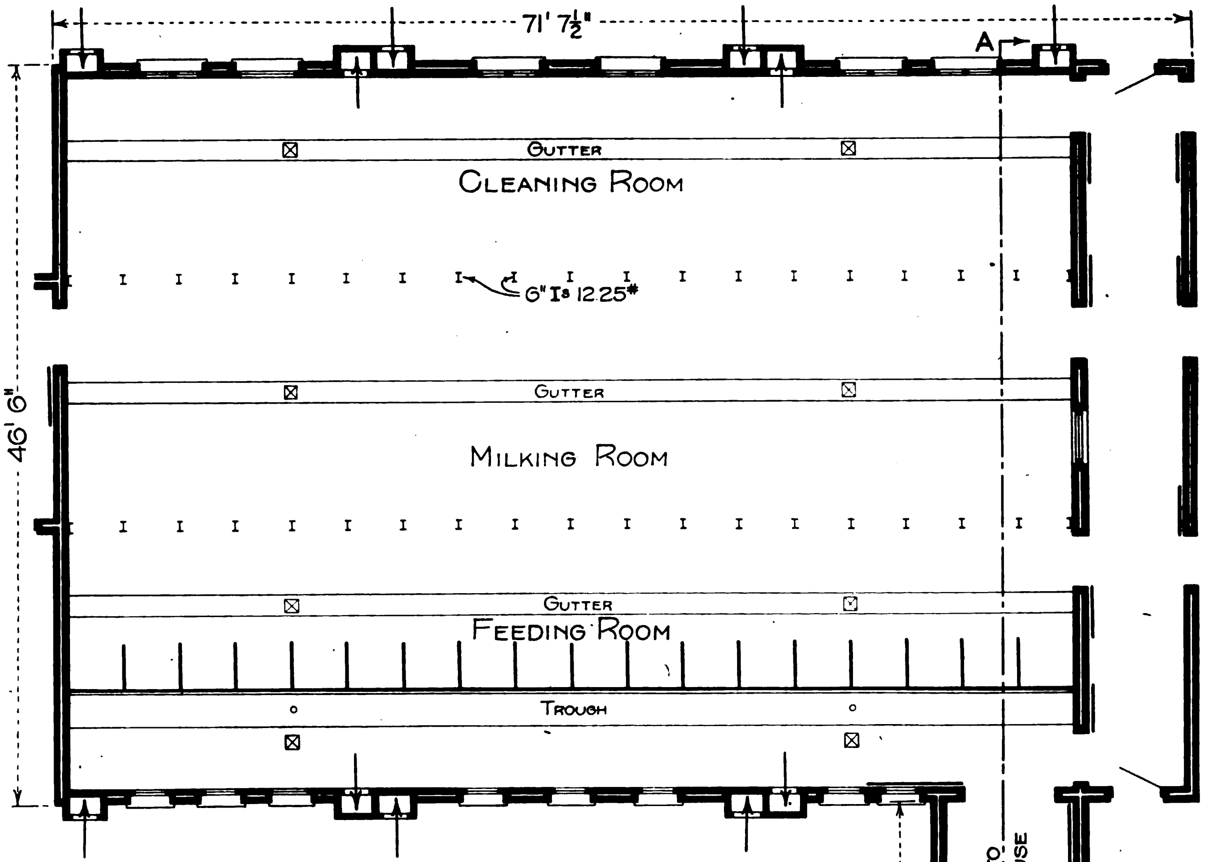
Wood floors laid over concrete were nailed to 2 x 4 in. doubled chestnut sleepers embedded in the concrete when the concrete was laid. The finished floors of 1 x 2½ in. Georgia pine were laid on these sleepers. The window sash, frames and doors were of hollow metal in the milking barn.

Where finished roofing was laid over wood sheathing, it was applied in accordance with standard specifications for J.-M. 4-ply Salamander asbestos built-up roofing, made by the Johns-Manville Co.

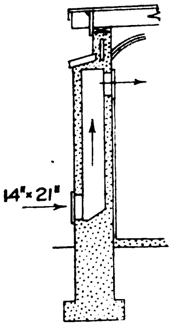
This plant was constructed for Dr. James Bishop at Juliustown, N. J., in accordance with plans and specifications prepared by Edward Burnett, architect, 470 Fourth Avenue, New York City. The contractor was Harry H. Vought, Jr., Grand Central Terminal Building, New York City.



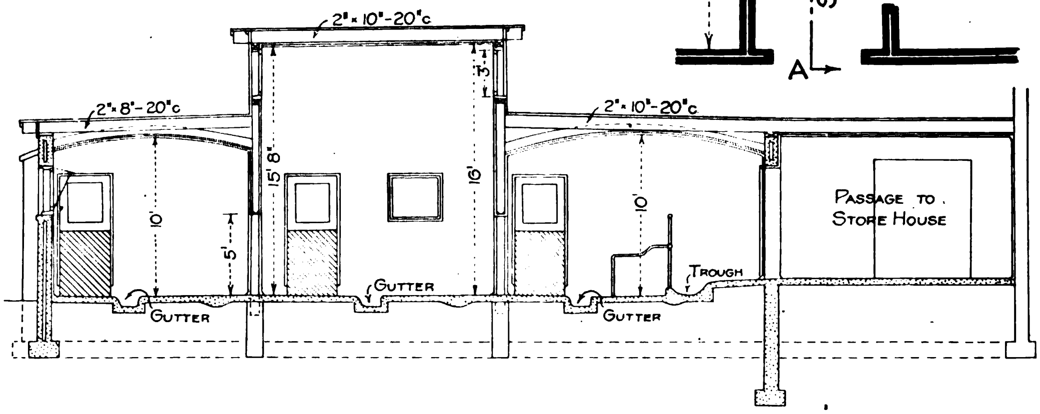
Double Wall Silos in Course of Construction



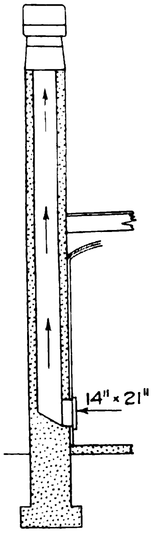
Plan of Milking Barn. Scale 3/32" = 1 ft.



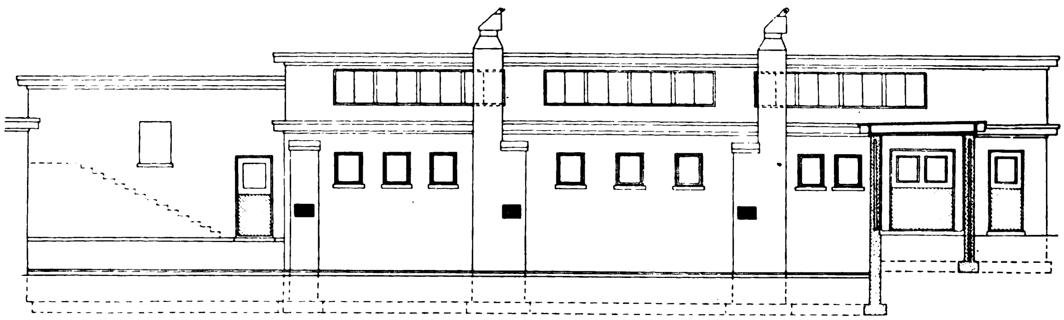
Inlet Vent. Scale ¼" = 1 ft.



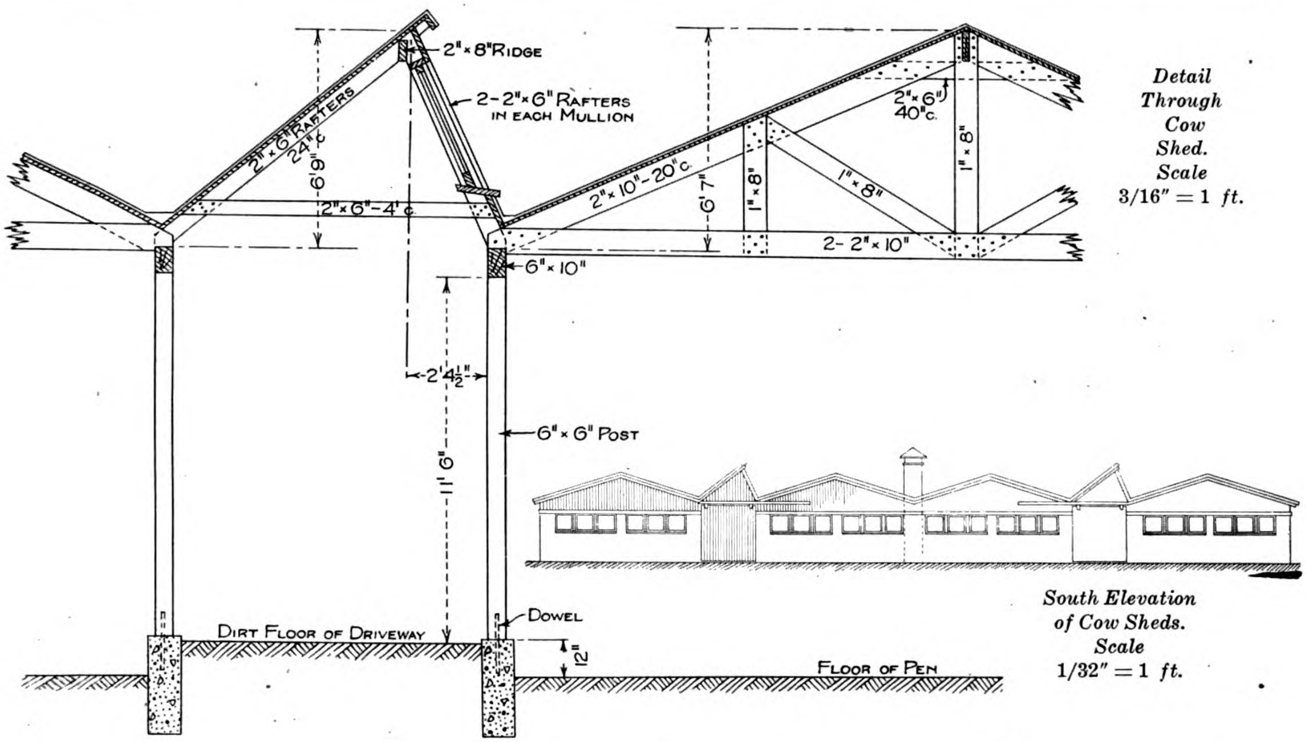
Cross Section of Milking Barn on Line A. A. Scale 3/32" = 1 ft.



Outlet Vent. Scale ¼" = 1 ft.

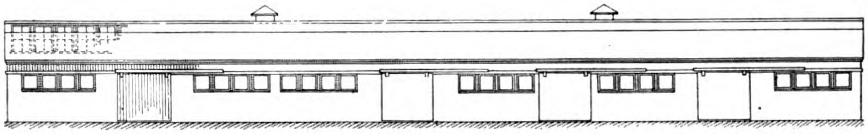


South Elevation of Milking Barn. Scale 1/16" = 1 ft.

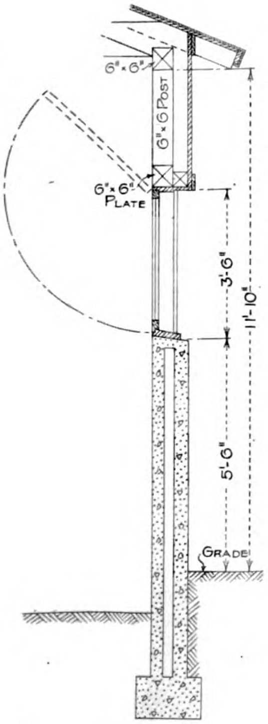


Detail Through Cow Shed. Scale 3/16" = 1 ft.

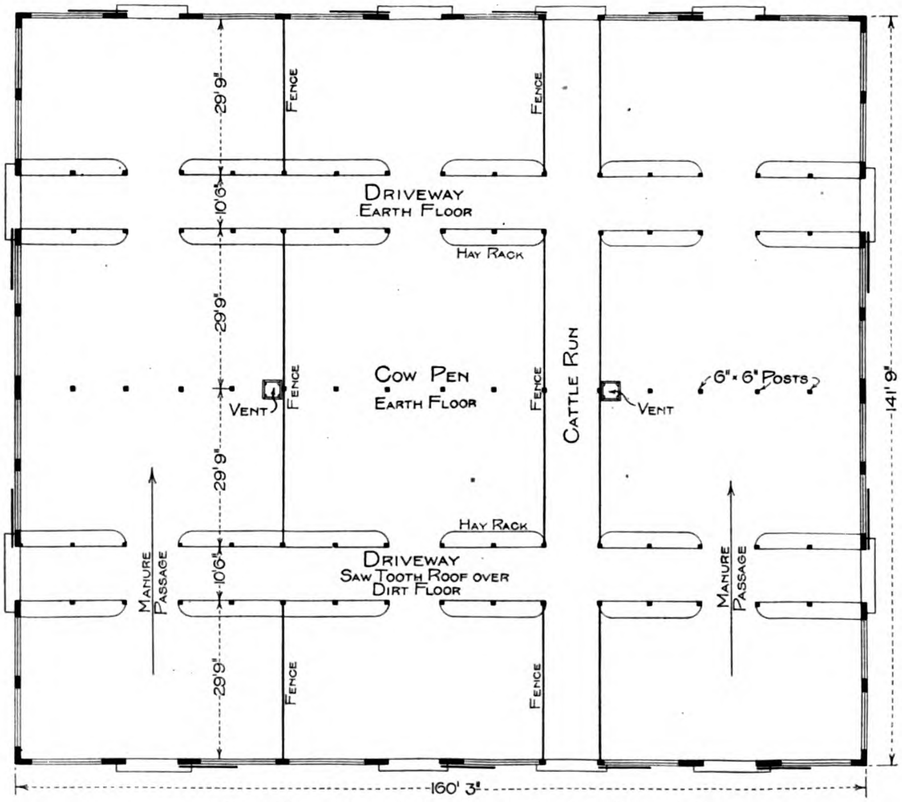
South Elevation of Cow Sheds. Scale 1/32" = 1 ft.



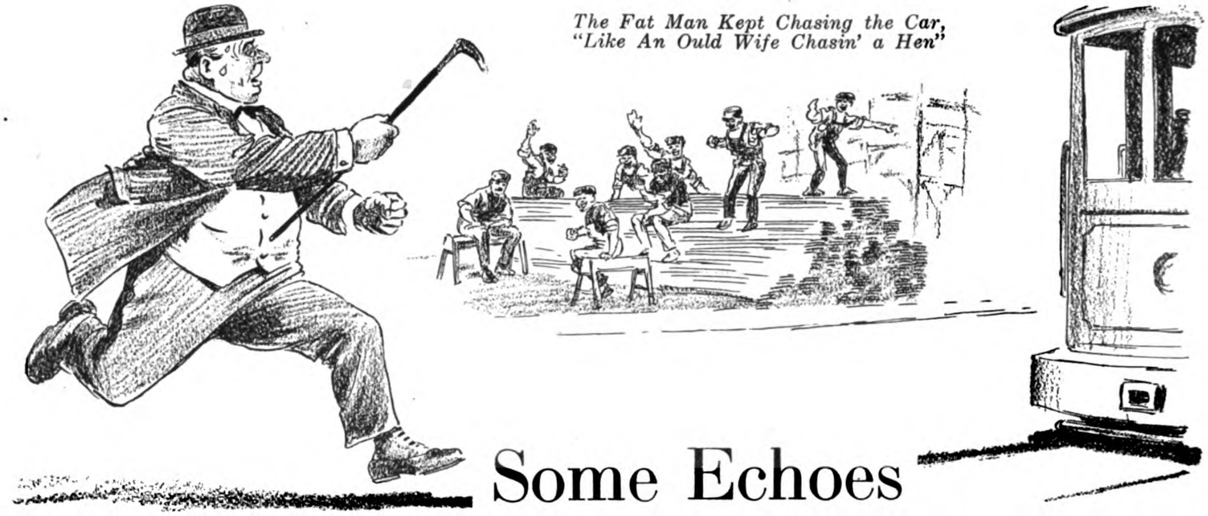
East Elevation of Cow Sheds. Scale 1/32" = 1 ft.



Cross Section Through Wall of Cow Shed. Scale ¼" = 1 ft.



First Floor Plan of Cow Shed. Scale 1/32" = 1 ft.



The Fat Man Kept Chasing the Car,
"Like An Ould Wife Chasin' a Hen"

Some Echoes of the Noon Hour—VIII

By Edward H. Crussell

THE members of the gang were sunning themselves on a pile of lumber in the front of the lot, the first warm day of the year, when they became interested in the actions of a corpulent old gentleman who came running up a side street, shaking his cane at a street car which had just passed the corner. The car stopped to let off a passenger at the next crossing and the old gent almost caught it, but, the conductor being on the front end, it started again before he could do so, and he was too much out of breath to make the spurt necessary to enable him to grasp the handrail. Nevertheless, he continued running and disappeared from the view of the gang, still shaking his stick, "Like an ould wife chasing a hen," as Scotty put it.

The kid, jumping up, ran out into the center of the street to watch the outcome and presently announced, "By golly, he caught it! What do you know about that?"

"Much good may it do him," said Old George, as the kid came back. "He'll chase a car once too often some of these days and drop down with heart failure or something. He's probably going to an appointment with someone who will be late anyway, and the next car would have done him every bit as well."

"It reminds me of what I was reading in the funny column the other night," chuckled Shorty. "An old fellow came running into the station, just as the train was pulling out. He chased it the full length of the platform and then came slowly back again. 'Ah, mister,' said the baggageman, 'you didn't run fast enough.' 'Lot you know about it,' growled the other. 'I ran plenty *fast* enough, but I didn't start *soon* enough.'"

"I think that I feel a good deal like George does about running after a street car," said Scotty. "Five mornings out of six I used to run my fool legs off to catch a car at the end of my street, only to stand, kicking my toes, waiting at the transfer corner, until the next car from my direction came along, before one would show up in the direction in which I was going. Makes a fellow feel pretty cheap to realize that by walking and taking things easy he would have been just as far ahead and would have caught the same car."

Old George nodded his head sagely. "Exactly, exactly," he agreed; "too many people run after things that they could easily do without, and once they start running they've got to either get what they are running after or bust something before they'll stop. It's the same trait of human nature that makes a fellow in an automobile want to get over the crossing ahead of the express. He'll waste twenty or thirty minutes before he starts or anywhere along the road, and then try to save ten seconds by risking his life.

"I used, at one time, to live near a railroad crossing in the suburbs, and I've often sat on my front porch of a Sunday watching some one-idea pedestrian, who would sprint for fifty yards in order to get over the crossing ahead of the train and then calmly stand and gaze after it until it had disappeared from sight. Sex made no difference; the women were as bad as the men, and the children were worse than either. I never was able to understand why they could not have watched the train go past before they crossed over, and sometimes, when there was a friend with me, I'd make a small bet with him that the man approaching would run across ahead of the train and then stand and watch it go past. I seldom lost. A ten-year-old boy was killed on the crossing one day. I didn't see it, but I began thinking of the many times when I might have done so, so we moved away."

"There's a good deal of food for thought in what you say, George," commented the foreman, "but, returning to the old gent with the cane, about whose heart you are so worried, there is one thing in connection with the incident to which I wish to call your attention. HE CAUGHT THE CAR. He set out to get that car, and he got it. A bunch of rough-necks on a pile of lumber yelled after him and made silly remarks; he paid no attention. He almost had it in his grasp once, but when it got away he didn't give up. He wanted that car so much that he made up his mind he would stay with the job until he either caught it or made good and sure there was no further use trying.

"Whenever I see a man running for a car or a train I am forcibly reminded of an incident of my youth, an incident that has been of much use to me in later life. It taught me to run out every hit

But When He Caught It the Laugh Was On the Bunch

I made and never give up till the umpire called me out and sometimes not then.

"When I was about twenty-two I was working in the maintenance of ways department of a railroad. The foreman of the gang got a step up and I, although the youngest, was in line for promotion. While things were all unsettled I was sent out on the line to distribute two carloads of small bridges. The cars were to be handled by the way-freight, which was to stop between stations, at my direction, to permit us to unload. I had a sheet of paper showing the mileages where the bridges were to be unloaded, and with five or six men I went up to the end of the division the day before and arranged the material in proper order for unloading.

"The way-freight was a mixed train for a part of its journey and carried a passenger coach in addition to the caboose. It left at 6 a. m., and bright and early I was standing around in the yard, showing off my importance and waiting for it to couple on to the coach, though I had ordered my men to climb aboard. The engine did a good deal of switching from one end of the yard to the other and then, while I stood and looked at it, coupled on to its train and set off. I began to feel shaky when it got down to the other end of the yard, though I was sure it had to come back for the coach, and when I saw it draw over the last switch and disappear around the bend I began to fear there was something wrong.

"I went over to the switch shanty and asked the switchman, 'Doesn't that freight have to come back and take the coach?' 'Not to-day,' said he. 'We need the coach for No. Nine, so the mixed will have to handle its passengers in the caboose. They never have more than one or two anyway.'

"Well! You talk about keeping cool in an emergency! I felt just as if I had swallowed a five-pound cake of ice. Here was I, with the nicely typewritten sheet of instructions, and there was my gang and the two cars of steel on their way home. Yes, I know. It looks like a joke from this viewpoint, but this isn't the place where you laugh; you wait a minute. It looks like a joke to me now, but it was the nearest to a tragedy of anything I had encountered at that time. Nothing could be expected from the train crew. They were ugly about having to make the stops anyway, and would be only too pleased to find that I had been left behind. Likewise nothing could be expected of the gang. They were jealous to think that I had been put over them, and would much rather ride back doing nothing than pushing and prying with pinch bars at those girders. They would, moreover, be tickled to death to have the boss find out that the smart Aleck of a kid he had set over them had fallen down on the very first job he had tackled.

"Away went my visions of a job as foreman; away went even the job I had, for if I wan't fired I'd surely be laughed at from one end of the road to the other, and at that time I'd rather have been shot at than laughed at.

"All these things went through my head like a lightning flash, and before the switchman had done speaking I had decided upon, and had started to do, the only proper thing in the circumstances. What was it? I started to *run after the train!* Now laugh.

"This act of mine was not quite so foolish as it sounds. There was no use in staying where I was. There was a way station about three miles further down the road where the freight would have some work to do, and if I ran hard enough, and they had work enough, I might possibly catch them before they got away. It was only one chance in a thousand, and I took it. As I ran I turned the situation over in my mind and decided that if the freight had left the station before I reached it I would wire the mileages to the conductor and order him to unload, signing the superintendent's name to the wire. The chief thing wrong with this solution was, the freight would pass some of the locations before the conductor could get my wire.

"About this time I got around the bend in the track, and could hardly believe my eyes when I saw the freight backing up toward me. What had happened was this: About a mile out from the yard limits there was a pretty steep grade, and in making a run for it the train had broken in two. They had connected up again and were backing up so as to get another run at the grade. I understood the situation thoroughly and continued running. I was so all in that I could hardly breathe, but when I saw the train stop about thirty yards from me and begin to pull in the other direction I knew that I had to catch it within the next minute or two before it got up speed, and, to shorten the agony as much as possible, I'll say I caught it. It was a good thing my arms were not so tired as my legs, because after grabbing the handrail I had to hang on for a minute or two while I got breath enough to draw myself up on to the step of the caboose. As it turned out, the freight did not lose more than a couple of minutes at the first stop, so that my scheme for catching it there would have been a failure if it hadn't been for that providence which is ever ready to help those who will do what they can to help themselves."

"Did you land the foreman's job?" queried Shorty.

"Yes," was the reply; "I landed it, and, if I remember correctly, I held it about ten days. Then in an argument with one of my men I knocked a couple of his teeth out, and to avoid any appearance of playing favorites the boss fired both of us. But, as I said before, catching that freight was an incident that taught me never to give up till the day after I was beaten, and every time I see a man running for a car or a train the event is made fresh in my memory."

"Say, boss," said Bliss, "weren't there any trainmen around the rear end of that freight? I've done some railroading myself, and I've always understood that when a train stopped between stations it was the practice to send out a man with a flag. Where was this fellow in your case, and why didn't he hold the train until you caught it?"

"I suppose you think that the tale I have just told you is a creation of my imagination," began the foreman. "As a matter of fact, it is every word of it true and it happened to me. I didn't wish to spin my yarn out too long, so I eliminated as many as possible of the details, but, seeing that you wish it, I'll explain.

I Want to Call Your Attention to the Fact That the Fat Man Kept After That Car Till He Caught It

"If all railroad men lived up to the rules at all times, there would never be any accidents, but you and I know that accidents do happen, consequently somebody must sometimes break the rules, and this was one of the times. In all probability what happened was this: The train had just left a division terminal where freight trains were made up and all other trains stopped long enough to change engines; consequently, the crew of the freight knew there could be no crew leaving the terminal for some time, and so they took a chance. Probably the flagman did go back a few yards for form's sake when the freight first stopped, but when it backed up for the run at the grade he climbed on again and went inside to finish his breakfast. Is the explanation satisfactory?"

"Oh, quite, quite!" hastened Bliss, with a grin. "I never for a moment doubted that it would be, especially after what you did to that fellow's teeth. I merely wanted to know what the explanation was, that's all." (*To be continued*)

A Few Practical Kinks from the Diary of a Carpenter

Some Makeshifts and Hints on Construction That Experience Has Proved to Be Useful

By Hammer and Saw

TO illustrate the variety of work the jobbing carpenter is called on to do at different times glance at Fig. 1. It will be seen that the door, which was made out of matched white pine flooring strips and held together with two cleats, had sagged away from the head jamb. This left a crack about 1 in. wide at the top of A. Also the threshold, which was hemlock, had become nearly worn through the center. The frame was not plumb and the floor had settled out of level. The house this door was in was an old one, the door being in a wing of the kitchen part, and the occupants were not "coupon clippers." I recommended weather strips to keep out the cold. However, the parties insisted I fix it up, so here goes.

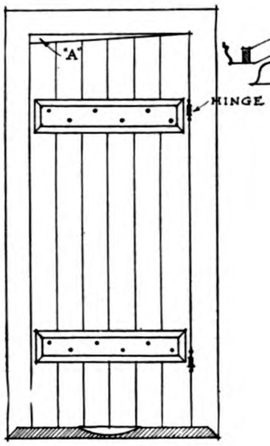


Fig. 1—Door and Threshold Before Repairing

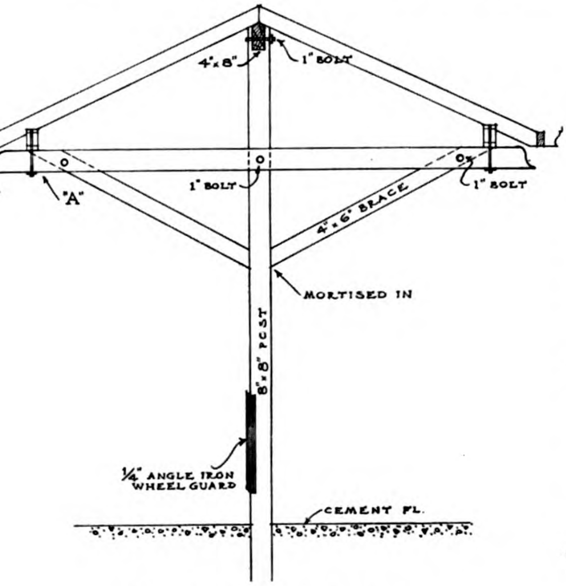


Fig. 4—End Elevation of Shed. Scale 3/16"

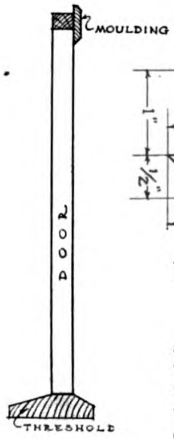


Fig. 3—Door and Threshold with Molding Applied

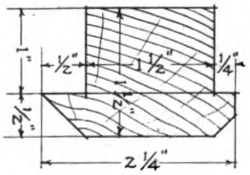


Fig. 2—Molding Used on Top of Door

I thought first of sawing the door ends square, but when I tried to take it off I found that the hinges had rusted so that I couldn't budge them without breaking, so gave that up and scribed across the top of the door to conform to head jamb, then sawed it off, making the opening at top 1½ in. Made a new threshold out of 1¾-in. rough maple, ripping the edges for wash and smooth planing a little. Placed threshold flat on floor, tight up to door, and scribed along bottom of door. Made the threshold too long, sawed off piece of end, and used it as template to mark inside of jambs. Chiseled out ¼ in. on each jamb for ends of threshold. Sawed off threshold right length, also door at scribe line, and drove threshold under door tight.

The opening at top of door was still in evidence, so rabbeted a pine strip, as shown at Fig. 2, to fill the opening. There was two lips left on the strip, the upper edge butting against head casing. Nailed through strip into top of door and used a few brads through beveled edges of moulding into door. At Fig. 3 is shown the threshold and moulding strip applied to door.

There were two doors I doctored in this manner. The work took me half a day. The people seemed to feel satisfied. I charged $3.50 for work and pieces of material used. However, I felt all day as if I had done a botch job tinkering up those old doors, but I consoled myself with the view that if I hadn't improved them any, at least I hadn't done them any material damage, considering everything.

Save the pieces sawed from rafter ends, for they come handy to use for blocking in between the two vertical boards that form the frieze in a box cornice of a porch. Nail them in about the same distance apart the ceiling joists are spaced. They form a bearing for the joists to rest on and also help to stiffen the frieze.

Fig. 4 is an end elevation of open shed built on each end of a railroad depot. The 4-in. x 8-in. cross pieces are 16 ft. long, one on each side of the post and gained in ¾ in. The posts are spaced 12 ft. apart, rafters are 2 in. x 4 in. spaced 2 ft. c., except the end ones, which are 2 in. x 6 in. All the framing pieces in the shed are Georgia pine. Fig. 5 is a detail of section A of the end elevation.

Beware of the common brown building paper. I never could see much benefit derived from using it. It's certainly a nuisance to place on the sheathing, especially on a windy day. Any good building quilt is superior in every way, but if it must be used I always aim to place as much as possible on the building and have it done with, instead of a piece at a time along with the weather boarding.

In building porches one method used in getting the slant is to rip the girts that carry the floor joists. When the floor is to be laid the long way of porch this way requires considerable ripping. A better way is to saw the end next to building for the required slant. Both ends of girt should be sawed the same bevel and either end will fit, and front end for base will be plumb. This is shown in Fig. 6. However, on old buildings that are not exactly plumb, it may be necessary to first hold the girt in posi-

tion for the required slant and scribe the end next to wall line. The cut can be obtained with the square. For instance, the floor is to slope ⅜ in. to the foot, then ⅜ and 12 in. are the figures to use on the square. However, these figures are unhandy to use with the square. When the flooring is to be laid the short way of porch the joists are nailed to the girts and can usually be sprung enough so their top edges will be flush with the girts.

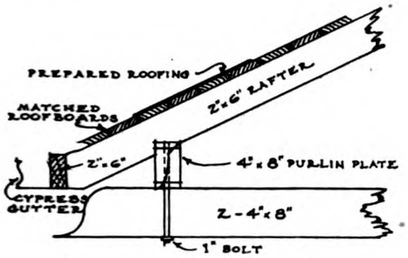


Fig. 5—Detail of Shed at "A"

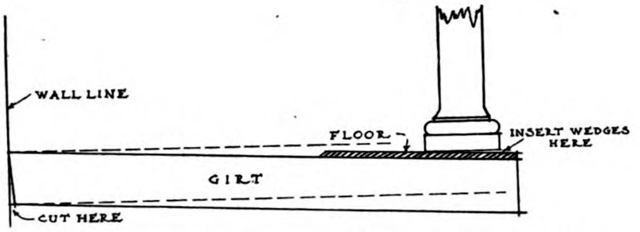


Fig. 6—Showing Method of Cutting Ends of Girts and Wedging Up Columns

Have noticed many times carpenters in setting the columns for a porch dress down the plinth block to the slant of the floor. When this is done, especially in cement floor, the dampness will cause the block to rot away in a few years. Saw some little wedges the slant of the floor for a foot run and place them under the plinth block as shown in Fig. 6. They will answer the purpose when setting columns; allow the whole thickness of block to be used and leave an opening for the circulation of air between the floor and plinth. The accuracy of the eye has to be depended on in plumbing round columns, but these wedges sawed similar to ones used in a housed string stair will answer the purpose.

Last summer we built a cottage, costing about $3,500. The cottage was admirably erected, except that the ceiling joists were 2 x 4s, adequate enough to support the lath and plaster. Recently the owner desired the attic finished off for a children's play room. Consequently heavier floor joists would have to be built up. Of course this can be done, but how much easier it would have been with very little additional cost to have used heavier joists in the first place.

Every year houses are built for rental purposes—built in the cheapest way, often in a hurry, and in some instances answer their purposes and make a profit for the owner. However, for the individual with modest means and planning a home of stability, it is always advisable to use the best material. Not anything extravagant, but just good serviceable material to be figured ahead of any superfluous jimmy cracks. Supposing the initial cost on a dwelling is $4,000. By skimping and using inferior material it can be built for $500 less. The $500 looks big and is often an inducement to use the inferior stuff, which is no real saving, for eventually this amount will be more than offset by premature repair bills and all-around dissatisfaction to the owner. In fact, it requires some mental effort coupled with common sense to plan a house in order to derive the most benefit for all concerned. Any individual feature in the construction, if practical, should always be commended also.

In a cottage of low elevation and low roof line there is considerable room in the attic, which can be used to some advantage at least, and it is well when planning the interior to keep in mind some certain spot for the stairs to the attic, even if they are not placed until later on. Also where necessary a trap door should always be provided, whether specified on plans or not, for access to attic in case of fire or other reasons.

* * *

How a House Was Enlarged

By James F. Hobart

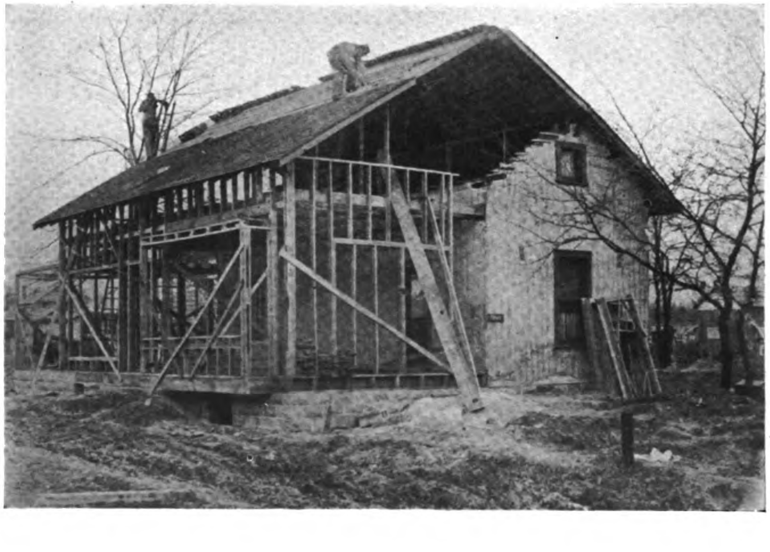
One of the most common stretching stunts which the builder is called upon to perform is shown in the accompanying illustration, which shows a small brick house, stucco-covered, being stretched to more than twice its original size. I was advised that the new portion was to be covered with wire lath and stucco to match with the original portion of the structure.

The striking detail about the building shown herewith is that the roof of the original building—half of it at least—has been carried bodily out to the new side line and used as a part of the new roof. The other portion of the original roof being left in its original position and new roof built upwards to the ridge, from both portions of the old roof.

The moving of the old portion of roof was accomplished in a very ingenious manner. The new side wall was erected, the plate put in position and held in place by one-half the upper set of floor joists which were put in place with alternate joists omitted. But the alternate joists were laid on top of the plate and on top of the brick side wall of the original building.

The old roof was then cut in two and freed from the old building as far as the portion to be moved was concerned. That portion of roof to remain was duly shored by placing temporary posts under it at the old ridge. The other part of the old roof was then freed from all connection with the old building and made to slide down off the brick gables until this section of roof laid flat upon the floor joists which were placed on top of the plate.

The half roof was then pried along until it came to its new location. Then



the foot was chained and roped to the new plate while the old ridge was raised to its new position and fastened by the lower end of each rafter, being spiked to the new plate. Then the new roof was built into the gap between the two old sections of roof and the alternate floor joists removed from their temporary place above plate and put where they belong.

Some Hints on Wood Bridging and Its Importance

By William A. Giesen, Architect

BRIDGING is so small an item that ordinarily most of us give little attention to the manner in which it is done and do not take the time to make an analysis of the functions which it performs.

"Bridging" is a system of bracing floor joist either by means of small struts, as shown in Fig. 1, or by single pieces of boards set at right angles to the floor joist and setting in between them, as indicated in Fig. 2.

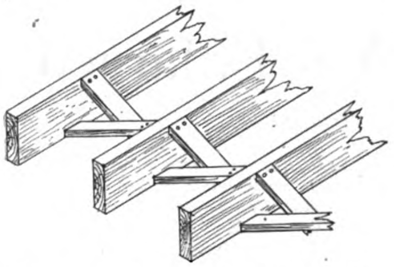


Fig. 1—The Proper Method of Placing Bridging

It should be carefully cut and accurately fitted and the nailing well driven up. Two cut nails should be used at each end. Cut nails are preferable to wire, as they have greater drawing power.

Bridging, as indicated in Fig. 1, is known as cross or herringbone bridging and is far superior to the straight type, indicated in Fig. 2, as the thrust acts parallel to the axis of the strut, while with that of Fig. 2 it acts across the grain of the timber.

The cutting of struts should be done carefully, the bevel being cut exactly right and straight, as indicated in Fig. 3. A full bearing is then obtained at *A—A* when nailed in position.

Struts should never be cut as indicated in Fig. 4, which are liable to split and do not give necessary rigidity.

The use of bridging does not materially strengthen a floor to resist a uniformly distributed load, but is decidedly beneficial for the sustaining and transmitting of any concentrated load which may be imposed. It also stiffens the joist and prevents them from turning sidewise and curling out of position, as indicated in Fig. 5.

Fig. 3—Bridging Should be Carefully Cut With Correct Bevel

Fig. 4—Bridging is Sometimes Carelessly Cut Like This

Fig. 5—Lack of Bridging is Apt to Cause the Joists to Shape Themselves Like This

The writer has by experience been taught that a large percentage of cracked plaster ceilings are caused by the omission of bridging or its inadequacy, as shown in Fig. 5.

Struts used for the herringbone type should be not lighter than 1½ in. x 3 in. to 2 in. x 3 in., depending upon the size of the floor joist, and should be set in rows of not over 8 ft. or under on centers in the length of the beams.

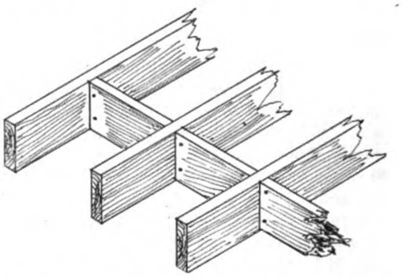


Fig. 2—Bridging Placed at Right Angles to the Floor Joists. This Practice is Not as Good as That Shown in Fig. 1

Bridging is such a small, inexpensive item and still such an important one that the author advocates its liberal use as a means of obtaining better construction and obviating the nuisance of cracked and sometimes dangerous ceilings and the annoyance of the jingling of lighting fixtures.

Shingling Kinks That Save Time

By John Upton

HERE are some kinks in winter shingling. For this section we generally use a line in warm weather, but in the winter I find it is better to use a straight edge. Get one as wide as you are laying the courses, but not wider. Generally this is 5 inches. Then you will not need to use a rule for measuring nor pencil for marking. The first two courses will need the line as usual, but after this the line need be used only every ten or twelve courses and then only to test the straightness of your work.

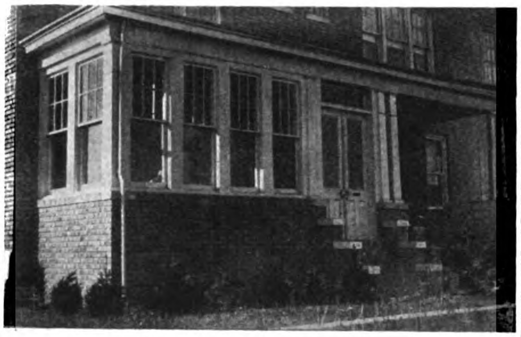
As soon as you get room for it, put a 2 x 4 in. staging in place, simply to hold the shingles from sliding off the roof. Nail this only slightly, as you will want to move it up further.

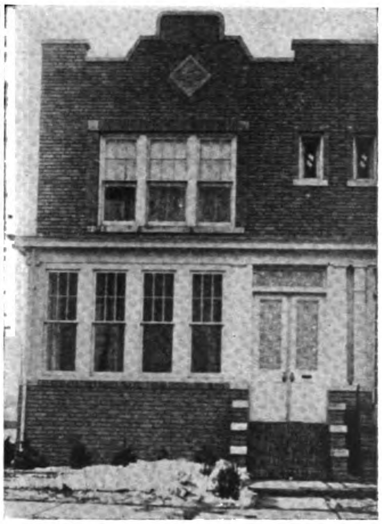
Some will object to the straight edge because one can lay only one course at a time, but if one will drop his hammer on to the 2 x 4 and use both hands to place the shingles, he will get several feet of the course in place quickly and then can nail them down rapidly. I find it best to place as few shingles as I can reach easily, then nail them fast and move on a few feet. Sometimes if the weather is cold and I must move about more I lay a whole course before nailing.

If one desires to lay two courses at a time he can use a short piece of board five inches wide and shove this along on top of the first course to form a guide for the next one.

When you begin a job get the shingles under cover if you can. In this section at least they need drying rather than wetting. If they do get wet and icy wear a glove on the right hand and lay shingles with this. Keep the left hand for handling nails.

In winter I use a hatchet in place of the hammer. It answers so many purposes, such as driving nails, chopping ice, splitting shingles and holds on the nail better.





Detail of the Completed Porch.

At the Left is a View of the Old Wooden Porch

At the Right the Completed Job is Shown

How a Brick Porch Was Built On To An Old House

By Fred A. Shore

THIS porch was built to make the house more attractive and at the same time increase its value. The old porch was small and open and it was decided to increase the size and inclose it, making it more comfortable for both winter and summer.

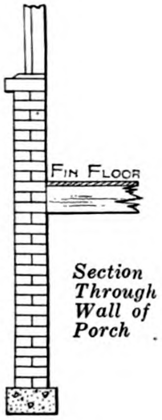
The old wooden steps and balustrades were removed and the floor beams and roof were shored up by temporary posts until the new wall was ready. A trench was dug, two feet below grade, the full width of the house with a return of seven feet on the end. A concrete footing was laid, six inches thick and twelve inches wide. The wall was built eight inches thick, of common brick, to the grade line. From there it was carried up with Buff Tapestry brick, laid up in a mixture of three parts sand to one part cement, with five-eighths inch bed joints and cross joints.

The brick were laid on edge on top of the wall, with one inch projection to form a sill course. The bond used is called a Flemish bond and is started from the corner with a six-inch piece, followed by a header, and then a stretcher. The second course is started with the six-inch piece showing on the return; this forms a quarter bond. The wall was tied to the old building by cutting holes three inches into the house wall, cutting them out with hammer and chisel by hand in every other course and putting the new brick into them.

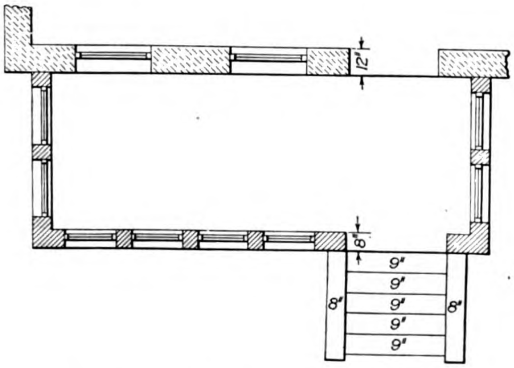
The walls were built on each side of the steps first and then filled in between with old brick and stone and made solid with concrete. The brick steps were then built on the concrete. The steps were formed by laying one course flat and one course on edge, thus making a step with a 7-in. rise and a 9-in. tread. The two step walls were finished off with concrete caps.

The window frames are known as knock-down frames. The frames can be made to fit any porch by making the box between them larger or smaller. Double sash were used with the top one made up with six lights and the bottom one with a single light.

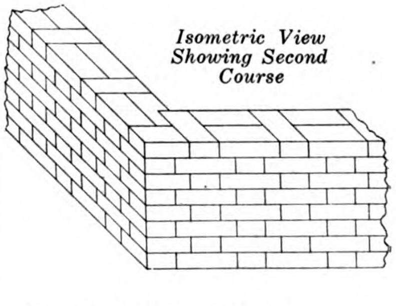
The frame on the return next to the old wall was cut to fit as close as possible and was made water-tight by coating a piece of quarter-round molding with plastic cement and fastening it to the frame. The end of the old roof was taken off and new rafters put in. These were fastened by cutting holes in the old wall and putting in beam anchors. The new part of the roof was covered with tin and was given three coats of Metallic Roof Paint.



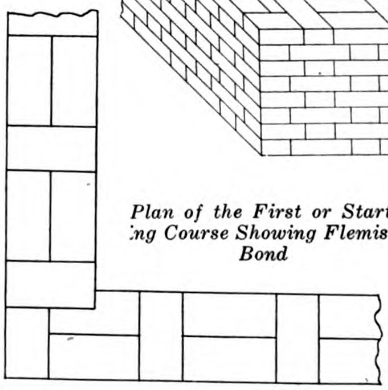
Section Through Wall of Porch



Broken Lines Show the Old House Wall, the New Work Being Indicated by Unbroken Lines



Isometric View Showing Second Course



Plan of the First or Starting Course Showing Flemish Bond

Department of
Masonry Construction
CONCRETE, BRICK, ETC.
Practical Ideas Which Will Help You Do A Quicker and Better Job

How to Design a Fireplace

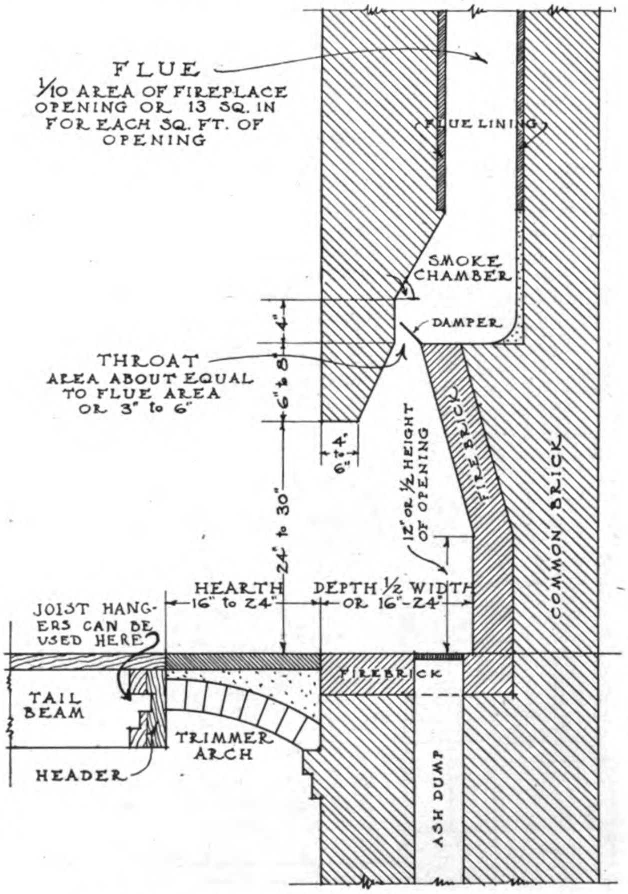
Proportioning the Various Parts Through the Use of Established Rules—Details of Construction

By Ernest Drah

THE open fireplace is an adjunct of the modern home which has held fast to an ever growing popularity in spite of its often inefficient construction due to builders ignorant of its scientific proportioning. A fireplace, like any other heating apparatus, depends for its efficiency upon certain principles which have been established as thoroughly reliable by reputable experts.

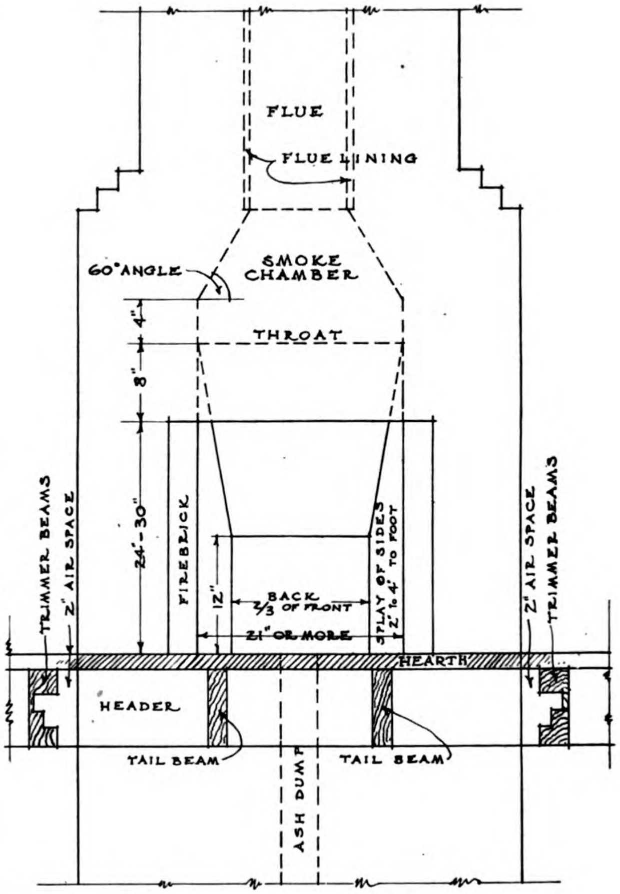
Features upon whose correct proportioning depends fireplace efficiency include: 1, height, width and depth of fireplace opening; 2, a proper splay to the sides; 3, correct throat area; 4, well shaped smoke chamber; 5, adequate flue area.

In designing a fireplace, the first thing to decide is the width and height of the fireplace opening. From this all other data is computed. Figs. 1 and 2 show the necessary dimensions, which are fully explained in the following:



CROSS SECTION

Fig. 1



FRONT ELEVATION

Fig. 2

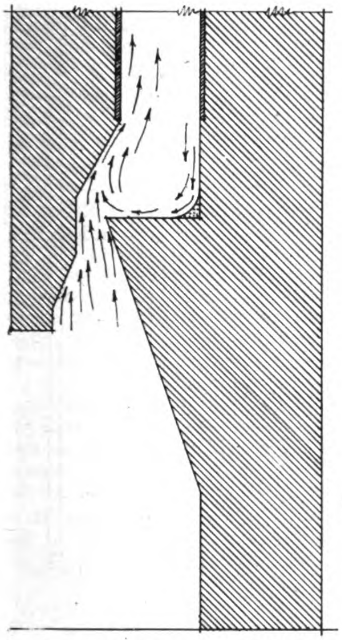


Fig. 3—*This Shows How the Smoke Chamber Works*

The fireplace opening should be not less than 21 in. wide. The height ought to be from 24 to 30 in., no greater height than 30 in. being advisable unless the opening is more than 48 in. wide. In general, width is much less objectionable than height, for a high fireplace gives too much opportunity for smoke to find its way into the room. The top of the opening should be kept as nearly horizontal as possible, for if it is curved very much, the smoke is likely to find its way through the highest point of the arch and out into the room.

After determining the proportions of the fireplace opening, the depth of the fire chamber should be established. This should be about one-half the width of opening, but should never be less than 16 in., 18 in. being a better minimum depth for a wood-burning fireplace. A depth of 24 in. is only necessary in a fireplace of a width over 60 in. unless the fireplace opening is made unusually high. A high fireplace opening is often made workable by deepening the fire chamber.

The back of the fire chamber should be two-thirds of the width of the front opening or less, making a splay of from 2 to 4 in. to the foot. This splay is necessary so that heat may be radiated out into the room, the principle being somewhat like that of a lantern reflector.

The back should rise vertically for about 1 ft. and then be drawn over straight, not curved, to the throat. A rise at the back of more than a foot is permissible in fireplaces over 30 in. high.

A facing of firebrick in the fire chamber is advisable, as shown, as it resists the heat much better than common brick.

The thickness of the top of the fireplace opening should be from 4 to 6 in. This thickness should not be exceeded, as smoke would then be liable to strike a broader top and be deflected into the room.

The back of the fireplace and the rear part of the front opening are drawn together to form the throat at a point about 6 to 8 in. above the top of the fireplace opening.

The throat should extend the full width of the fireplace and be from 3 to 6 in. wide. The area of the throat should be about equal to the area of the flue, but it is advisable to make the throat area slightly greater than the flue area and provide a damper to take care of any excess width. This will provide for all contingencies and insure throat efficiency.

Just above the throat is the smoke chamber, which provides for the expansion of the gases and prevents down draft forcing smoke into the room. The sides of the smoke chamber should rise straight up for one course of brick, or 4 in., and then be drawn over at angle of about 60 deg. until they have the required flue width. The rear of the smoke shelf should be rounded so as to help down drafts swirl around and ascend with the heated gases rising through the throat. The angle from the arch to the throat varies according to the depth of the fireplace and the thickness of the chimney breast.

The manner in which the smoke chamber works is shown in Fig. 3. The down draft, as shown by the arrows pointed downwards, strikes the smoke shell, is deflected toward the front of the smoke chamber, strikes the heated gases which are rising through the throat at high velocity, and is carried up with them, as indicated by the arrows. The narrowing of the throat, it will be noticed, causes the heated air to "draw together," and insures a high temperature of the gases. It also has a tendency to increase the velocity.

A rectangular flue should have an area equal to from one-tenth to one-eighth of the fireplace opening. Another rule giving about the same result provides for 13 sq. in. of flue area to each square foot of fireplace opening. A circular flue requires an area of from one-twelfth to one-tenth of the area of the fireplace opening.

The flue should be placed directly in line with the center of the fireplace so as to pull equally through all parts of the throat. If placed to one side, it will pull more on that side, thus causing the other side to smoke.

The flue should be lined with terra cotta, care being taken to see that all joints are made tight and that no broken or cracked tile is used. The brick flue should be built an inch wider each way than the calculation calls for so as to allow for the placing of the flue lining without bringing the flue area less than that calculated. It should be remembered that rectangular flue linings are listed by outside measurement, not inside, and that, as linings are about 1 in. thick, this allowance in the rough brick flue is necessary to bring the correct dimensions.

The hearth should be of ample width so that sparks and flying embers may not fly out onto the floor. A width of from 16 to 24 in. is usually sufficient. Although it is generally constructed so as to lie above the floor line, yet this makes it troublesome when sweeping ashes, etc., into the fire chamber. For this reason, it is better to depress the hearth slightly below the floor line.

If a wooden mantel is used, it should be placed high enough not to be blistered or warped by the heat.

Sometimes an ash dump is desired, as

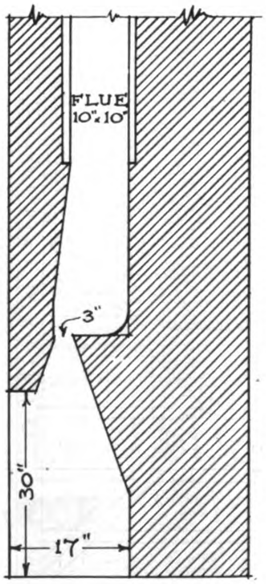


Fig. 4

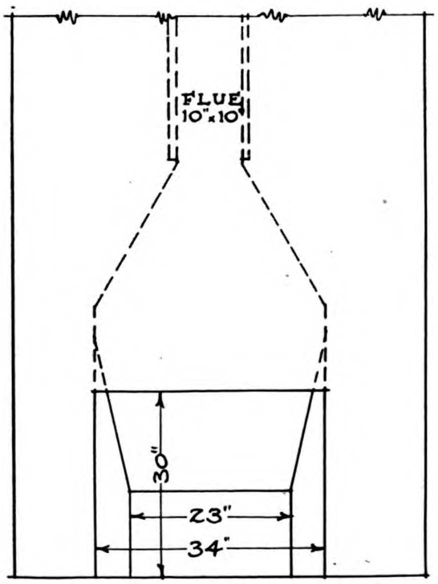


Fig. 5

Section and Elevation of a Fireplace Designed in Accordance With the Principles Stated in Connection With Figs. 1 *and* 2

it facilitates cleaning the fire chamber of ashes. This is merely a conductor with a trap door leading from the rear of the fire chamber down to a clean-out door in the cellar.

This description covers the main points of the essential features of fireplace proportioning. Figs. 1 and 2 show pictorially all these features so as to enable the reader easily to refer to them in his designing.

Suppose that it is desired to make a practical application of the facts given in the foregoing explanation and illustrated in Figs. 1 and 2, these facts being utilized in a fireplace intended to be 34 in. wide.

With this width, a height of 28 or 30 in. is permissible, the conclusion being arrived at from an examination of Figs. 1 and 2, which are self-explanatory.

The depth of the fire chamber is one-half the width, that is one-half of 34, which is 17 in., although 1 or 2 in. greater depth would not be amiss.

The back is calculated as having a width of two-thirds of the front, that is two-thirds of 34, which is about 23 in., although less is permissible.

The flue area should be at least one-tenth of the area of the fireplace opening. The area of the fireplace opening is 34 x 28 in., which is 952 sq. in. One-tenth of this is 95.2 in., the flue area required. A 10 x 10-in. flue would be sufficiently large, as its area is 100 sq. in. In ordering the lining, it is necessary to remember that rectangular flue linings are listed by outside measurement, and the lining is then ordered accordingly.

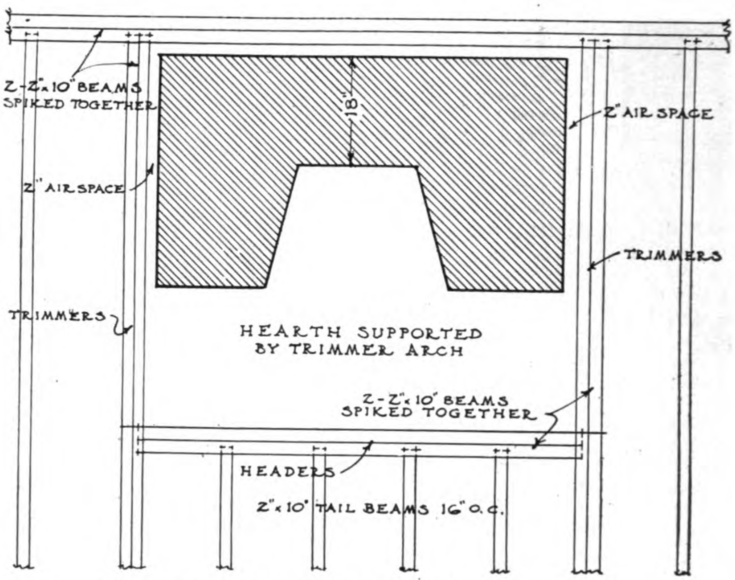


Fig. 6—How Joists Around a Fireplace Are Framed

The throat should have an area equal to or slightly greater than the flue. As the throat must extend the width of the fireplace, its length is fixed at 34 in. By dividing this length of 34 into the flue area of 100, the answer of about 3 will be found. Then 3 in. will be the required width of throat.

The other dimensions of the fireplace are more or less fixed and unchangeable, as shown in Figs. 1 and 2. Figs. 4 and 5 show respectively a cross section and front elevation of the fireplace just designed. The proportions of any fireplace can be found by calculating the dimensions in a manner exactly similar to the foregoing.

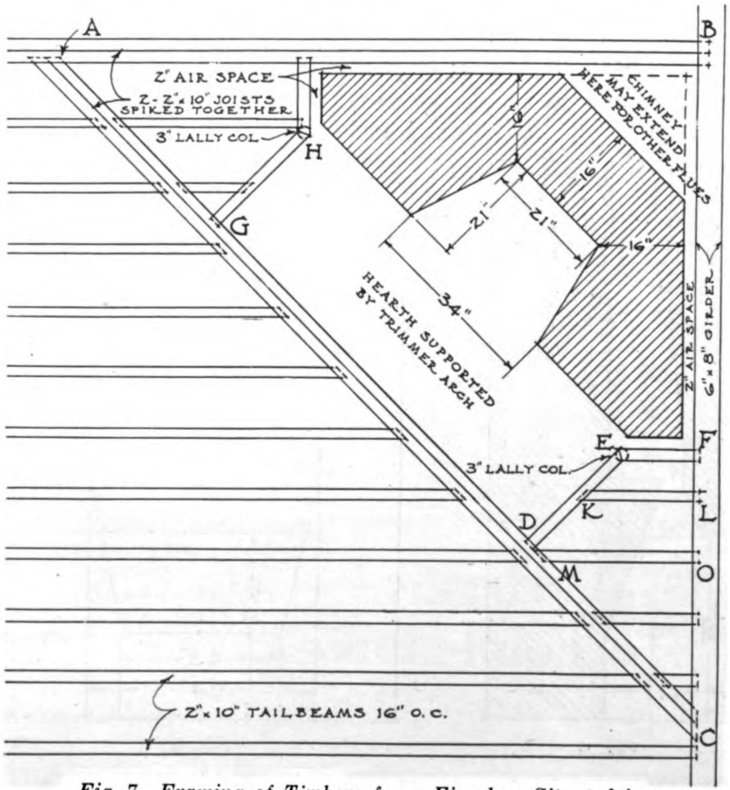


Fig. 7—Framing of Timbers for a Fireplace Situated in One Corner of the Room

When a troublesome fireplace is to be corrected, it is only necessary to work out by the foregoing rules what the various dimensions should be, compare the different proportions of the two, and then take steps to correct the mistake thus found.

One of the essential features of fireplaces and flues is that all places through which the heated gases must rise should be kept as smooth as possible. Various patented smoke chambers, throats, dome dampers, etc., are provided by manufacturers, which aid in simplifying the mason's job. Sometimes one of these contrivances will require a construction of some minor part slightly different from the foregoing, but as the manufacturers furnish full descriptions of their apparatus and give all necessary data for its successful installation, no difficulties should be experienced.

Some of the essential features of construction are as follows:

There should be at least 16 in. of brickwork between the fire chamber and any adjacent woodwork. Furthermore, an air space of 2 in. should be provided between the brickwork and any woodwork. Beams should be flashed with tin on the side adjacent to the brickwork and, in the very best construction, the air space of 2 in. should be filled in with mineral wool. Metal lath, well painted before affixing, should be used for furring around chimneys.

The hearth should be supported upon a trimmer arch as indicated in Fig. 1, a filling of concrete or cement being placed above it, as shown, to receive the hearth stone or tile.

In framing timbers and woodwork

around a fireplace or a chimney, the greatest care, as before stated, should be exercised to leave an air space of at least 2 in. between the brickwork and the woodwork. The manner in which this is done in connection with an ordinary fireplace is shown in Fig. 6, which shows an economical and easy manner by which this requirement may be met. The doubled 2 x 10 beams should be well spiked together and framed by a tusk and tenon joint, which will afford ample security. Iron joist hangers may be used in place of framing the various members together, which will obviate any weakening of the beams by cutting out. Joist hangers made by a reliable firm are thoroughly dependable and save a great deal of labor which would otherwise be expended in cutting the joists. The necessary air space is shown left all around the brickwork.

The framing for a fireplace situated against the wall, as shown in Fig. 6, is a very simple matter, but greater difficulty is met with in the framing of a fireplace placed in an angle. Fig. 7 shows an economical and reliable method of accomplishing this bit of work. An examination of the illustration shows that the fire chamber is surrounded at all sides by at least 16 in. of brickwork. The 2-in. air space is also clearly shown. At the right a 6 x 8 in. girder, which, it is presumed, spans one section of the house, is shown. Should the construction require, this may be replaced by two 2 x 10-in. joists. Doubled 2 x 10-in. floor joists are shown framed into this girder at B. Doubled 2 x 10-in. beams span the front of the opening and are framed into the other joists, as shown at A and C. The 2 x 10-in. tail beams are framed into this, as shown. DE and EF abut against each other at the angle shown at E, being supported by a 3-in. lally column. A wooden post may be used instead of a lally column, but the latter is better considered from the fire standpoint. Short beams KL, MO, etc. afford support for the flooring.

It is a great temptation for a builder to carry the beams, DE and GH, over to the chimney and support them thereon, as this would render the use of a lally post or extra piece of timber unnecessary. Such practice cannot be too strongly condemned, as an examination of fire records shows that such construction forms a frequent cause of fires.

Instead of framing the timbers together, as shown in the illustration presented, joist hangers may be used.

Figs. 6 and 7 show the proper construction of framing when the fireplace is alone in the chimney, no extra provision having been made for adding flues which other apparatus might render necessary, as this article is confined to fireplaces alone, but by following out the same ideas as here outlined, the builder should have no difficulty in rendering his chimney and fireplace construction absolutely safe.

Making a Concrete Watering Trough

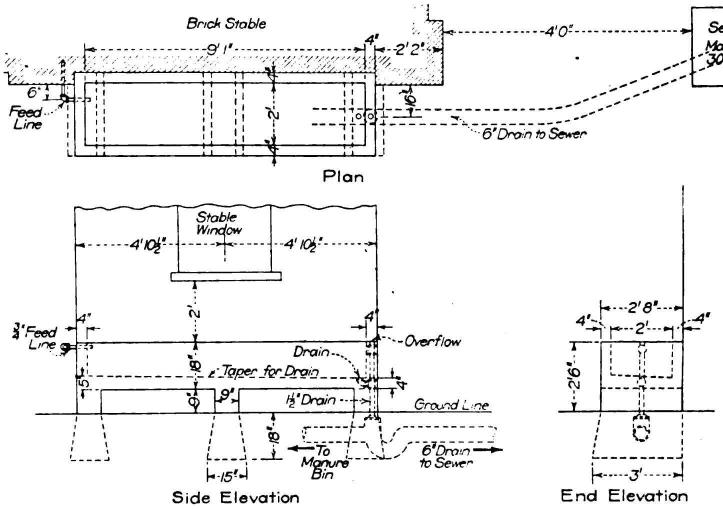
By George W. Childs

THE concrete for this watering trough for horses is of a mixture consisting of one part cement, two parts sand and four parts broken stone. The drawing shows the trough built against the wall of the stable—the outline of the latter being indicated by the shaded portion. It can be built, however, in any suitable location, according to preference.

The bill of material is as follows:

BILL OF MATERIAL

Quantity	Description	Material	Remarks
1......	Trough	Concrete	1,112 cu. yds.
2......	1" Tees	C. Iron	
1......	1½" Ell	C. Iron	
2......	Pipes	W. Iron	12" long, 1½" dia.
1......	Pipe	W. Iron	2" long, 1½" dia.
1......	Pipe	W. Iron	1½" long, 1½" dia.
1......	Pipe	W. Iron	1" long, 1½" dia.
1......	Ell	C. Iron	
1......	Pipe	W. Iron	6½" long, ¾" dia.



Plans and Elevations of a Concrete Watering Trough

In the construction of the trough the usual wooden "forms" were made and the concrete poured into them. The location of the feed pipes, drain pipe and overflow pipes are clearly shown on the drawing. A sewer takes the drainage from the trough and in the particular case in point is also used for draining a manure bin which is located nearby. The capacity of the trough is 147 gal.

How to Make Lettering Mold for Concrete Tombstones

By James F. Welliver

A SHORT time ago I made a couple of tombstones of concrete, and the method of preparing the "molds" for the lettering may be of interest to some readers of the paper who are called upon to do concrete work of various kinds. The proportions which I used for the concrete mixture were three sacks of cement to one cask of lime and about six bags of sharp sand. In making the mold for the lettering I cut out pieces of cardboard with a pocket knife, making what might be termed a stencil. These placed in the concrete turned the trick.

Construction of Concrete Feeding Floors

A Feeding Floor Is a Money Saver for the Farmer. Build One for Him. This Article Tells You How

By *W. G. Kaiser*

Corn becomes pork where a concrete feeding floor is used—there is no waste.

A clean sanitary concrete yard that is enjoyed both by the herdmen and the animals.

THERE is no equipment on the live-stock farm that will bring larger or surer returns than a concrete feeding floor. Experienced stock feeders claim their feeding floors have paid for themselves in one season in the amount of feed saved and the more rapid gains secured. Many owners of feeding floors estimate the amount of feed saved as high as 30 per cent.

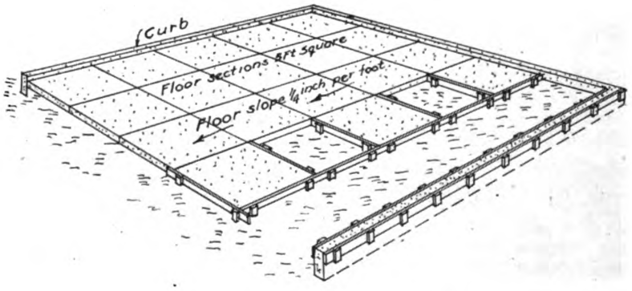
There is not only greater gain in weight of hogs fed on floors where grain cannot be lost but there is the added sanitary advantage resulting from feeding on a surface which cannot absorb filth and can be easily cleaned. Feeding stock on concrete floors reduces the labor of feeding considerably, because the floor can be permanently located near the crib or granary and it will not be necessary to seek new feeding grounds in bad weather. Everyone knows that at some seasons an unpaved feed lot will become a mudhole, while if feeding is done on a concrete floor there is no wading through mud either for the farmer or the animals.

A feeding floor must be large enough for the herd it must accommodate. Overcrowding is dangerous and should be guarded against. In practice, it has been found that fifteen square feet of floor space will be about right for each 200 to 250-pound hog. The following table shows the size of floor required for different numbers of hogs:

No. of Hogs	Sq. Ft. of Floor Required	Sacks of Cement	Cu. Yd. of Sand	Cu. Yd. of Pebbles
10	150	17	1¼	1¾
20	300	33	2½	3¾
40	600	65	5	7¼
60	900	98	7¼	11
80	1,200	130	9¾	14½
100	1,500	163	12 1/10	18

Each 10 lineal feet of curb and apron requires 2¼ sacks of cement, 4½ cu. ft. of sand and 6¾ cu. ft. of pebbles.

SECTION



PERSPECTIVE OF FEEDING FLOOR

All of the above based on a 1:2:3 mix. Floor 5 inches thick.

A feeding floor should be located so that it will be slightly higher than the surrounding grade to insure good drainage from beneath the floor. To save time and labor in feeding, a location near the crib or granary is desirable. A location on the south or east side of the crib is ideal, because of the protection against cold winter winds thus offered.

To meet all desirable requirements a feeding floor must have a surface that will be even, easily kept clean, and will not absorb filth; a surface that can be easily disinfected and of a material that is permanent. Concrete best meets these requirements. Concrete floors are moderate in first cost and practically everlasting.

Concrete feeding floors are easy to build. Experience in concrete work is not necessary if the builder is careful to follow directions. Concrete feeding floors may be likened to a series of sidewalks laid side by side. The floor slabs are best made not more than five feet square to allow for expansion and contraction. If the floor is ever to be moved it will pay to make smaller squares.

Where the ground is firm and well drained, concrete may be laid directly upon the soil after it has been brought to the proper level and firmly compacted. All low places and soft spots should be filled in and tamped.

Forms are made of two-inch lumber, 2x4s or 2x6s, and should be set to the proper grade so that a slope of at least one-quarter inch to the foot will be secured for adequate drainage on the floor surface. The forms should be well staked so that they will not spring out of line. Care should be taken so that the top of the forms will be at the level that is wanted for the finished floor. Then when the concrete is struck off flush with the top it will have the required slope.

Not all the area which it is intended to build should be laid out with forms at one time. Forms for one row of slabs only need be provided. The side forms are placed the proper distance apart and held in position with stakes driven into the ground. This strip is then blocked off into five-foot squares with cross pieces. Concrete should be placed in alternate squares and when these have hardened sufficiently to stand up the cross pieces can be removed and the intermediate slabs concreted. In this way one row of slabs after the other may be placed until the floor is completed.

A concrete feeding floor should be made five inches thick, and of one course construction, which means that the concrete is of the same mixture throughout and is placed with one operation. A 1:2:3 mixture makes the best floor. This means one sack of Portland cement to two cubic feet of clean well graded sand to three cubic feet of clean, well graded pebbles or broken stone. Finishing should be

done with a wooden float, which gives an even gritty surface and forms a sure foothold for the animals. After the concrete is placed it must be protected by covering with moist earth or similar material kept wet by frequent sprinkling. This should be kept up for a week longer. It will require several weeks until the floor is sufficiently hardened to be used for feeding hogs.

It is a good scheme to have a curb on all sides of the floor except that on which the hogs enter, in order to prevent grain from being shoved off the floor while feeding. A concrete apron should be built entirely around the floor to prevent the hogs from rooting underneath and to keep the rats out.

The entire floor need not be built in one season. One strip after another may be added as the herd grows.

Making an Inexpensive Concrete Fence Post

Fig. 1

Fig. 2

Fig. 3

Fig. 4

Fig. 5

HAVING had considerable experience in building concrete fence posts, the author has designed and put into effect the following method, and which solves certain problems and cheapens the cost:

A piece of Oregon pine 6 x 6 in. x 7 ft. long was taken to a mill and dressed down to four sides, having a measurement of 5 x 5 in. at one end and 2 x 2 in. at the other, this wooden post being used as a form for casting the posts in the ground, as shown in the accompanying pictures.

First, as shown in Fig. 1, the form is laid on the ground and the mechanic, using a small garden hoe, scrapes out a small trench of about the dimensions of the form, and, as shown in Fig. 2, the form is placed in the trench and tamped lightly into the ground until flush with its surface, and after the ground surface is smoothed off even with the top of the form, a few taps endways and sideways with the wooden tamper the form can be removed, as shown in Fig. 3, leaving a perfect impression in the earth. This impression is then filled with concrete that is wet enough to be poured and when filled the concrete should be puddled so that there will be no air bubbles.

The reinforcement can now be put in. In this case one strand of barb wire the full length of the post was pressed in near the center of the concrete. The concrete is then smoothed off on top, after which a short piece of lath was pressed into the concrete at different points crossing the post where the wire is to connected and after the concrete has hardened these pieces of wood are taken out, leaving notches in the post to retain the wire.

The concrete posts should be left in the ground for at least eight to ten days and when taken out a perfect piece of concrete will be the result. The best time for doing this work is when the soil is moist, which insures the proper tempering for the concrete. Most any old wire would be well suited for the reinforcement in this work, and to give the posts a clean, well-made appearance they should be painted with a grouting mixed one part cement to one part fine sand.

In this instance 130 posts were built by two men in two days of eight hours each, without previous experience and with only the crudest of tools.

Assuming that only 100 posts were built in two days, the costs would be:

Seven loads of creek sand (no gravel), $3, 3 cents per post; ten sacks of cement at 60 cents per sack (one sack to ten posts), $6, 6 cents per post; two men, two days, at $2 per day each, $8; 8 cents per post; one piece of barb wire, 7 ft. long (reinforcement), $2, 2 cents per post; total, 19 cents per post.

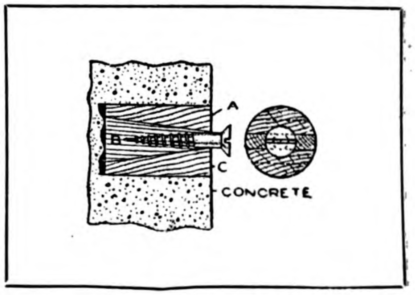
Redwood posts 4 x 4 x 7 ft. are quoted in the market at 23 cents each. By this construction a saving is made of 4 cents per post.

The mixture for the above post was proportioned one part cement to four parts ordinary creek sand.

The farmer who owns his own team and wagon and has creek sand near at hand and some old barbed wire for reinforcement, need only spend 6 cents a post for material, as he will have to buy cement. — *Engineering and Cement World.*

An Expansion Plug for Use in a Concrete Wall

A WOODEN expansion plug for holding a screw or bolt in a concrete wall may be made quickly, as shown in the accompanying sketch. A round wooden 1-in. plug is sawed diagonally, so that the cross section will show three parts, A, B, and C. The plug is placed in the drilled hole in the wall, and the screw started in the wedge end of B, expanding it tightly against the walls of the hole under an outward pressure. The plugs are best uniformly machine cut.—*Popular Mechanics.*



Attractive Architecture of a Colonial Cottage

Features of Plan and Design Which Make This Dwelling Unusually Interesting

UNUSUALLY attractive is the Colonial cottage which forms the subject for our colored supplemental plate this month. Its long, steep roof is excellently proportioned to the first story of the house, and the dormer, which provides for plenty of room in the second story, scales in excellently with the proportions fixed by the main roof and the first story. Well in keeping with the simple spirit of the house is the unostentatious yet attractive doorway, which merely consists of two brackets extending out under the wide overhang, and two porch seats. The brick set on end, which form the steps, are well in keeping with this simple stoop.

The front door is reached up a small walk which leads through the attractive gateway at the right and which was, by the way, built by the owner during spare moments.

The second story of the house is rendered commodious in the rear by a well proportioned dormer.

Entrance is had directly into the living room, an illustration of which we present from a point of view just outside of the front door. At the left is a large rough brick fireplace laid up with wide joints. Just beyond the fireplace is the stairway leading to the second floor and also, as it is a combination affair, affording access between the living room and the kitchen. The ceiling is beamed. At the right of the illustration are the French doors leading to the porch, a view of which we present.

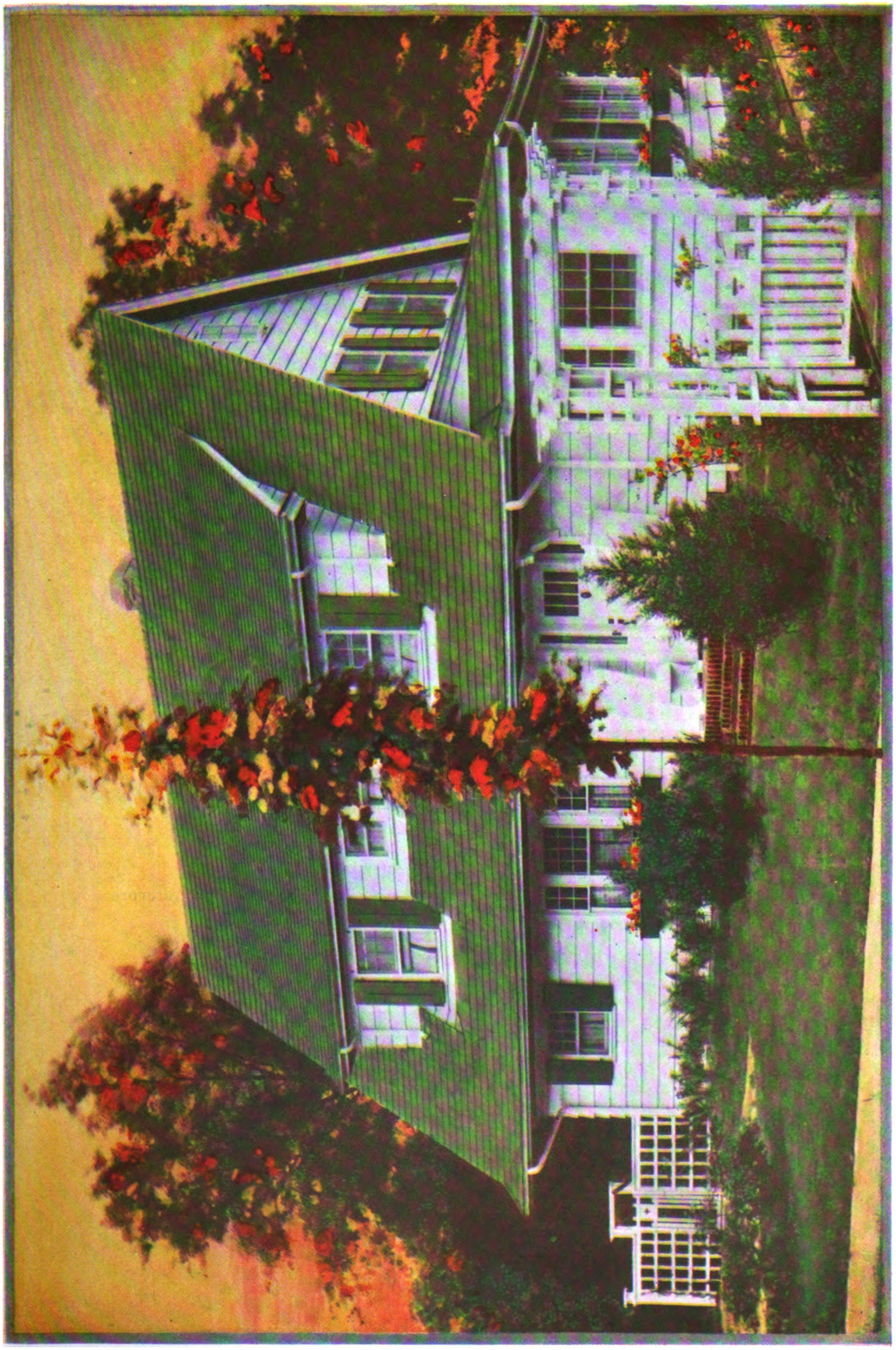
The porch is walled inside with the same style of clapboards that were used for the exterior of the house. At the corners of the porch are large columns, which can also be seen from the illustration of the exterior which we present. Large windows admit plenty of air and light. The porch floor is of cement, which was painted blue.

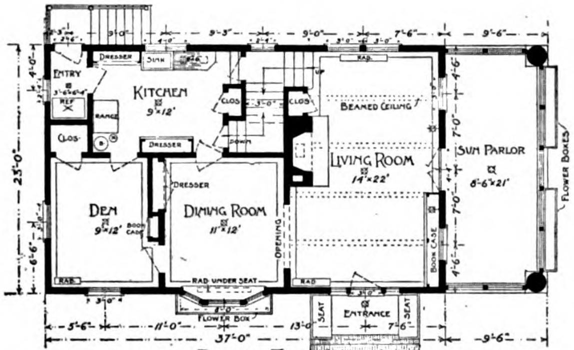
At the left of the living room is the dining room, a picture of which we present. The open door leads to a small den or sewing room which is especially convenient to the feminine portion of the household as it communicates directly with the kitchen so that the mistress of the house can attend to the cooking and yet be thoroughly comfortable in the sewing room. This is a factor that housewives who do much of their own work will appreciate. The dining room contains a built-in buffet as shown, and a plate rail runs around the room. At the right of the illustration is the door leading into the kitchen.

The kitchen is especially convenient, and its arrangement was planned by the mistress of the house after long months of thinking as to just what would be the most convenient arrangement and which would obviate as many unnecessary steps as possible. The sink is located directly under a large window and is thus afforded plenty of light. Directly at the left of the sink is a dresser so that all dishes which are washed can be placed in the dresser with a minimum of effort. A gas range is placed over at the opposite end of the kitchen. Another dresser is placed directly opposite the sink. At the right of the kitchen is a closet. One side of this closet is flanked by the short stairway communicating with the living room. At the right the closet is flanked by the stairs leading down to the cellar. At the left side of the kitchen is the entry porch, in which is placed the refrigerator.

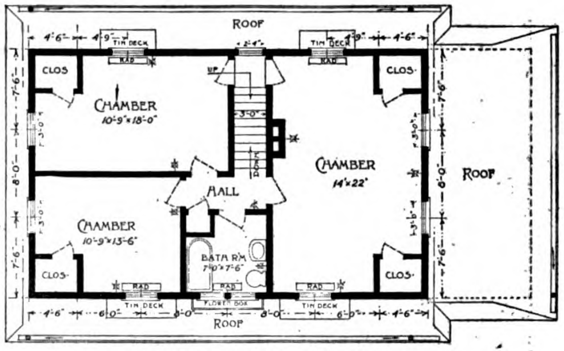
The second story is economically planned. There is very little hall space. At the right side of the house is a large chamber extending the full depth of the dwelling. The trim is very simple, as shown in the illustration presented. The picture moulding is placed high up and all trim is of such a nature as to allow cleaning with a minimum of effort and is enamelled white. The walls are painted with waterproof paints so that they

The Living Room



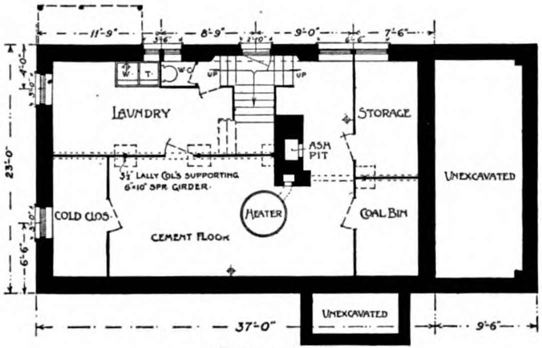


PLAN OF FIRST STORY



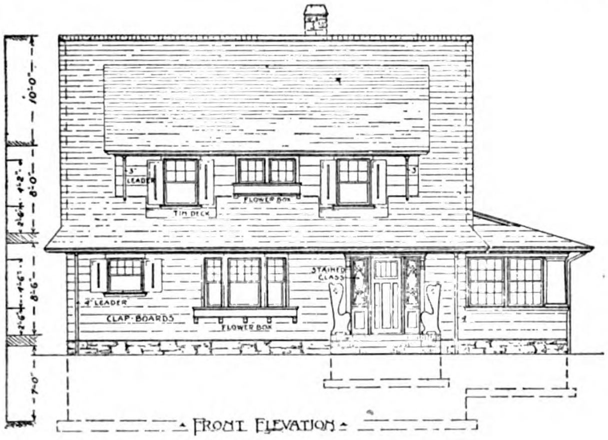
PLAN OF SECOND STORY

Scale of Floor Plans 1/16 Inch to the Foot

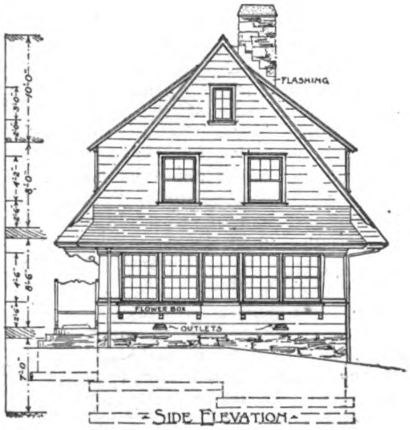


PLAN OF CELLAR

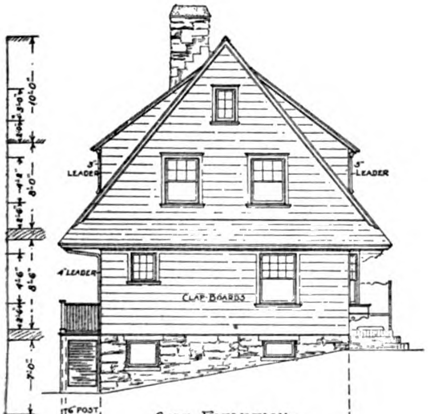
Scale of Elevations 1/16 Inch to the Foot



FRONT ELEVATION



SIDE ELEVATION



SIDE ELEVATION

REAR ELEVATION

The Dining Room, Showing Part of the Den

can be washed down without injury to the surface.

The basement contains a laundry, at one end of which is a toilet. The arrangement of this is especially convenient as it opens from the small landing which communicates with the exterior and also communicates with the laundry, and besides affords a quick means of exit to the exterior. At the left of the cellar is a large cold closet for the storage of various preserves, etc. At the right is the heater and coal bin.

The footings are of stone 12 in. deep and 12 in. wider than the wall; the foundation walls are also of stone pointed inside and outside with Portland cement mortar. Around door and window frames were pointed with cement mortar of a 1:3 mix. The door and window sills in the cellar are of cement 5 in. thick. Above grade the walls are of selected stone laid up with a white mortar joint.

The cellar floor consists of concrete mixed in the proportions of one part Portland cement, three parts sand and five parts broken stones, all laid to a thickness of 4 in. To this a 1 in. top dressing of cement was laid, it being applied before the lower course dried so as to form a monolithic mass.

The chimney is of common red brick, and was built of stone above the roof. It is provided with a cement cap. The flues are lined with terra cotta, a 9 x 13 in. one being used for heat for the fireplace and the same size for the heater. The lining was set in cement and was run from the bottom of the clean-out door to the top of the cement cap. Where the chimney passed through the roof it was flashed and counter-flashed with target and arrow tin painted both sides.

The framing timbers are of spruce. some of the sizes of the more important members being as follows. Sills 4 x 6 in.; girders 6 x 10 in. supported on 3½ in. Lally column; posts 4 x 6 in. with 2 x 4's spiked thereto at the corners; plates 4 x 4 in; first and second floor joists 2 x 10 in., placed 16 in. on centers and cross bridged every 8 ft. with 1¼ x 3 in. stuff; the second floor ceiling joints are 2 x 6 in. placed 16 in. on centers; studs are 2 x 4 in. placed 16 in. on centers and doubled over openings, all openings over 4 ft. being of a 4 x 10 in. header trussed. The rafters are 2 x 6 in. placed 2 ft. on centers, the collar beams 2 x 4 in. placed 5 ft. on centers; the floor joists were doubled on the partitions running the same way; the partitions were cross bridged with 2 x 4 in. stuff.

The rafters were covered with ⅞ x 2 in. spruce lath placed 3 in. on centers on the main roof and 4½ in. on centers on the dormer roof. Over this were placed Creo-Dipt shingles exposed 5 in. to the weather on the main roof and 4½ in. to the weather on the dormer roof. The soffit of the main overhang was ceiled with ⅞ x 6 in. double beaded North Carolina pine finished with a mold. The lower cornice has a 4 in. crown mold finished with a 6 in. fascia and 3 in. bed mold under the soffit. The lower gables have a 1½ x 6 in. berg board and crown mold and bed mold. The deck was covered with ⅞ x 3 in. North Carolina pine over which was placed target and arrow tin painted on both sides. The soffits were given two coats of varnish.

The exterior walls were covered with ⅞ x 10 in. tongued and grooved North Carolina pine sheathing surfaced on one side and nailed to every bearing, joists being broken on studs only. Over this was placed waterproof paper which received ⅞ x 12 in. cedar siding exposed 9½ in. to the weather. At completion, this was given three coats of lead and oil, the side shingles were given two brush coats.

The exterior trim is of cypress which was given two coats of Atlantic white lead and linseed oil.

The front porch is constructed of 4 in.

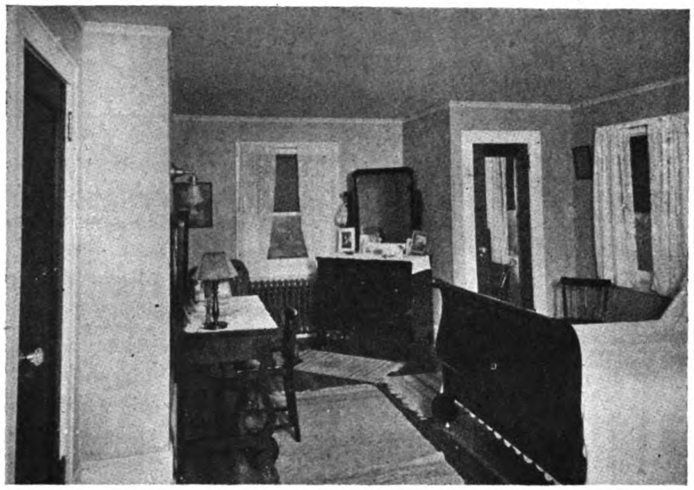
The Back of the House

of concrete over which was applied a 1 in. top dressing of cement. An 8 in. retaining wall of brick was built around the cement. The brick steps have 7 in. riser and 12 in. treads. The rear porch steps are of fir.

The front entrance door is of white pine and is 2 in. thick. The interior doors are of chestnut in the living room, dining room and den, and in other parts of the house are of a one panel birch veneer type. The entrance to the porch is through French doors of white pine 1¾ in. thick.

Windows are of both double hung and casement type, being glazed with double thick American glass.

The trim in the living room, dining room and den is of chestnut which was given one coat of filler, two coats of stain rubbed and one coat of wax rubbed. The trim throughout the rest of the house is of whitewood which was given three coats of flat white rubbed between each coat so as to obtain a dull finish. Part of the work was enameled.



A Bedroom

The plastering was applied to spruce lath run horizontally with joints broken every tenth course. The laths were well nailed to every stud and joints were broken on studs only. All angles were solidly formed before plastering, exterior angles being formed of metal corner beads. Two coats of plaster were first applied and over this was applied Keene's Windsor cement.

The sub floors throughout are of matched pine surfaced on one side and laid diagonally.

Over this was placed Cabot's sheathing quilt, double ply. In the living and dining rooms the finished floors are ⅞ x 2 in. oak with a 16 in. border running around. All other finished floors are of comb grain North Carolina pine.

The main stairs are of chestnut with oak treads. The risers are ⅞ in. thick and the treads are 1⅛ in. thick.

The beamed ceiling in the living room is 12 x 6 in. in dimensions boxed of 1⅛ in. stuff. The fireplace is built of rough red brick. The back lining and back hearth are of fire brick and the front hearth is of cement marked off. It is provided with a covert throat damper. The trap to the ashpit is a Jackson No. 9, and the ashpit is provided with a No. 12 cleanout door. The hearth is carried upon a trimmer arch. Built-in book cases are provided at the right of the entrance door. In the bath room boards were cut in between the beams to receive 4 in. of concrete over which was applied a top dressing of cement which received small ceramic tiles. The walls were covered with 24 in. gauge expanded metal lath to a height of 4 ft. and this received two coats of cement to which were applied 3 x 6 in. enameled tile. The bath is a 5 ft. Standard "Adapto" built in. The lavatory is of a Standard oval type 20 x 27 in. respectively along its major and minor arcs. There is a syphon water closet with a china low-down tank and china bowl and mahogany seat.

The kitchen is provided with a 20 x 36 in. soapstone sink with integral back, set 36 in. from the floor.

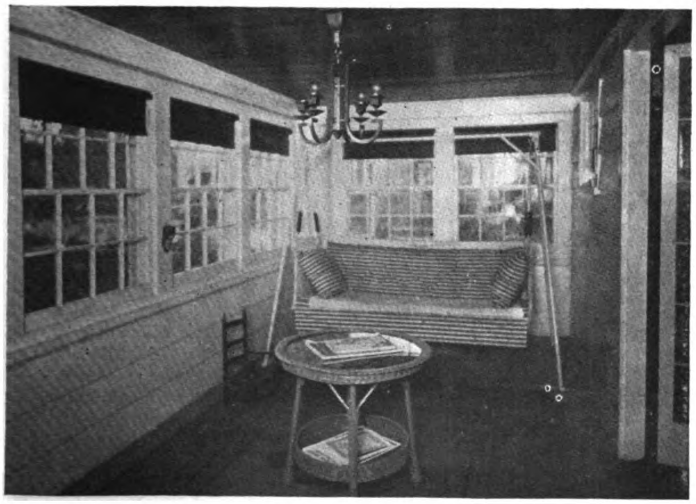
Lighting is by means of electricity, the installation being of the type known as the knob and tube.

Heating is by means of hot water, a Honeywell hot-water heating outfit being installed using a 222T Richardson & Boynton boiler of 825 ft. of radiation, and American radiators. The cellar mains were covered with asbestos air-cell covering.

The house sewer is connected to a cesspool placed 25 ft. from the house. The cesspool is 5 ft. in diameter and is 10 ft. deep, and is set at least 8 ft. lower than the cellar. It is covered with a large stone slab.

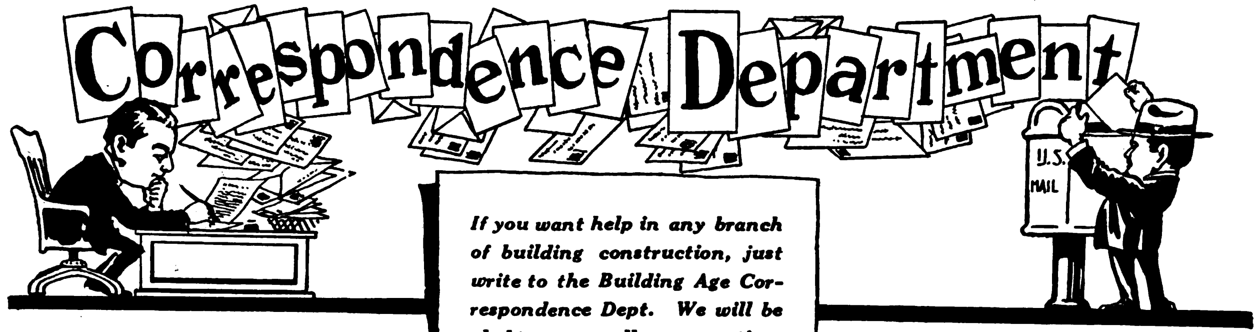
The gutters are of galvanized iron 5 in. in diameter supported by heavy iron hangers run well up under the shingles. The leaders are corrugated. The gutters on the inside and outside were given two coats of metallic paint.

This dwelling is located in Larchmont, N. Y., and was constructed in accordance with plans and specifications prepared by H. Leon Hentz, who intended it for his own occupancy.



The Sun Parlor

Correspondence Department



If you want help in any branch of building construction, just write to the Building Age Correspondence Dept. We will be glad to answer all your questions without charge.

Questions should be confined to construction only, as the editors cannot undertake to design structures.

All readers are invited to discuss the questions and answers published.

Pergola Construction

From John Upton, La Fargeville, N. Y.—In answer to F. J. S., Wellsburgh, West Va., who asks about a pergola, I should use two rows of columns, set about 15 ft. apart.

The most popular post is the turned wood column of classic design, solid or built up of staves. Solid ones should have a hole through the entire length to prevent splitting or checking. The modern stave columns with interlocking joints is the proper thing to use. The stock for these should be two inches thick.

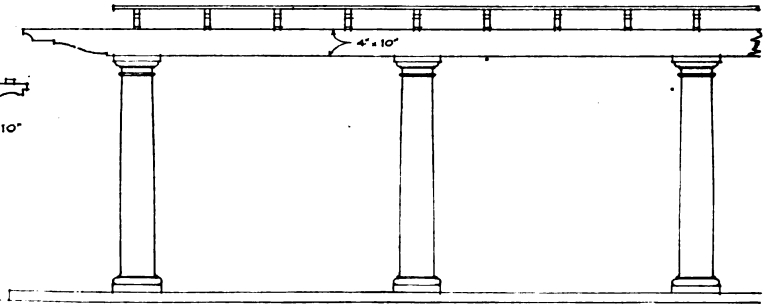
The most durable material for these columns and for the entire structure would be cypress, because it resists decay, even though not painted.

It is quite necessary to anchor the end columns to the foundation, to prevent winds from blowing it over, and it would be well to anchor some of the others, as this is a large structure.

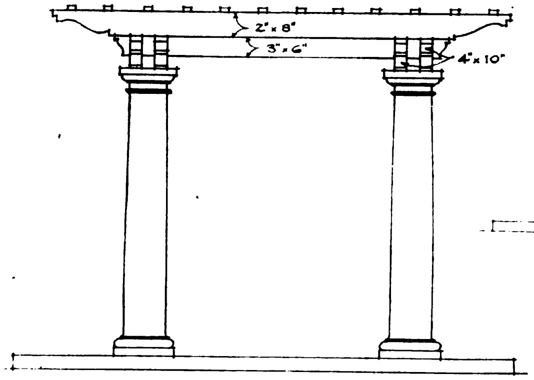
The ends of the girders and rafters can be cut to any desired shape. All the woodwork should be painted or stained one coat before being put together. A pergola is always out in the weather exposed to water and heat and so should be well built and of good material.

It will be painted once, but after it is covered with vines the trouble will begin. At the joints where the cross pieces rest on the joints and where the posts rest on the foundation decay comes first, so here one should take special care and also use some good lasting wood. Perhaps cypress is the best, but I wonder if oak and clear white pine would not come next.

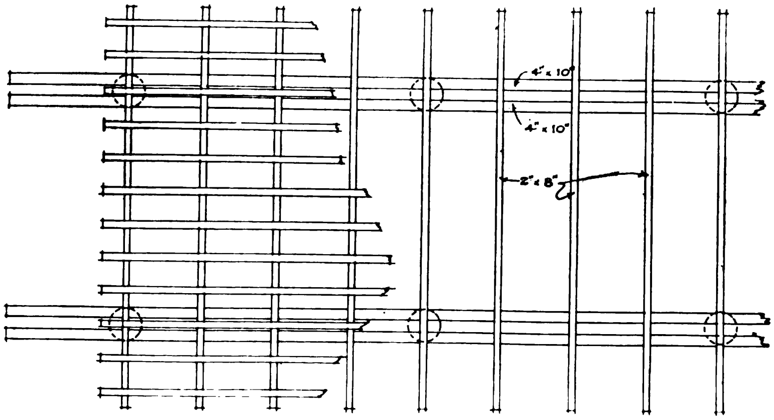
I inclose sketch as asked for.



Side Elevation



Front Elevation



Plan of Pergola

Post Cap and Girder Construction

From R. W. W., Dayton, New York.—Regarding the Post cap and Girder construction in the February, 1917, number will say, in this instance the Girder was of solid timber and the cap and bolts were used in lieu of a scarfing method, consequently leaving the whole strength of the timber less bolt holes, and no doubt Mr. Upton is familiar with the different styles of scarfing. I agree with him in the instance of a built-up girder to let at least one of the pieces overlap so as to form a tie across the building in the same way floor joists overlap across the girder, and personally believe overlapping the joists and nailing them securely is the strongest way, however, where there is a city ordinance to comply with beam hangers have to be used either of wrought iron or steel.

There seems to be a difference of opinion with different authorities regarding the strength of built up verus solid timber

girders. A veteran of the Civil War once told me that trees about two feet in diameter at the butt tapering to about a foot and from 60 to 90 ft. in length were felled, two were placed across a stream, they were notched varying from 3 to 6 in. deep so that smaller trees could be placed at right angles on these for an army to cross with heavy baggage and cannon. I have observed longer spans of solid timber than of built up timber, and if any reliable tests have proved built-up girders to be the stronger then why is it stipulated that the joints of built-up girders should break over the supports—why not disregard this entirely letting the joints break any convenient place just so two joints don't come together?

The method as suggested by W. K. to the inquiry of C. A. C. of Holliston, Mass., makes a continuous tie and the best to use providing the joists can be secured 21 ft. in length, the longest joists generally carried in stock are 18 ft., so I presume special ones will be sawed. The joints will all come over the supports, two alternate joints at each 10½ ft. support and there will be 2 10½ ft. pieces to fill out at each end. Should the joists be cut 10½ ft. and butt together on the supports I would use two pieces of wrought iron or steel, ⅜ in. thick, 3 ft. long, the same depth as joists, one piece each side of girder, bolted tight together with 1-in. bolts for tension stress. Diagonal struts are often used from post to girder on longer spans as an added stiffner. Probably the correspondent C. A. C. has before this constructed the girder and it might be interesting to know just the way he used.

Could any of the readers who are familiar with the manner of installing revolving doors like those in city buildings furnish details of their working mechanism, any special framing necessary and are they as practical as regards, cost, service and popularity as the hinged swinging door?

Another Letter of Appreciation

From Lawrence S. Keir, Cragsmoor, N. Y.—This evening I have been reading the March issue of BUILDING AGE, which arrived in to-day's mail. I would like to second Mr. Edward H. Crussell's letter regarding the announcement of the resignation of Mr. Henry Colwell as editor of BUILDING AGE.

I have been more fortunate than Mr. Crussell in that I have met Mr. Colwell several times on matters of business in the way of small articles for BUILDING AGE, and, as Mr. Crussell says, he was always interested in helping a fellow along. I am sorry Mr. Crussell never had the pleasure of meeting Mr. Colwell, as he would have found him all that he would have expected, and more, too.

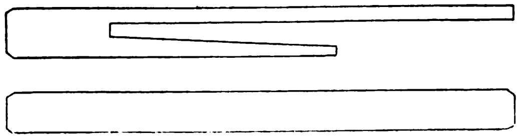
I first learned of Mr. Colwell's resignation a few weeks ago when I stopped at the BUILDING AGE office in New York to see about some articles I thought might be of interest to readers of BUILDING AGE. As might be imagined, I was rather taken back to learn that Mr. Colwell was no longer there. However, I met the new editor, Mr. Ernst Eberhard, and was very cordially received. I believe we are going to like our new editor also.

Comments on Anchoring Sills and Clapboard Marker

From D. P. B., Redford, N. Y.—I cannot say that I am altogether in accord with the method of anchoring sills as shown by "Hammer and Saw" in his Fig. 1 in the November issue of the paper. The sill will certainly stay on the wall, but what is to prevent the rest of the building going? In my opinion only vertical or diagonal boarding outside will help it.

In times gone by we used something like his clapboard marker, but I made one which I think is more satisfactory for the purpose. I am sending a sketch of one I have used for more than 30 years. I made it out in Kansas, using maple for the material. It is absolutely accurate when a fine pencil is used and the line left on. If the corner board is beveled it will mark to fit the bevel if properly held.

A Clapboard Marker Preferred by One Builder



Another Method of Drawing Large Arcs

From V. J. B., New Orleans, La.—After thinking some time about the matter, I have decided to write concerning "Another Method of Drawing Large Arcs," which appeared on page 33 of the December, 1916, issue. The dividing of the quarter circle is similar to that of C. J. W., Berkley, Va., on page 247, Oct. 1897, issue. The difference between them is: C. J. W. says square from the springing line the distances 11, 22, 33, etc., and W. S. W. says parallel to the lines 11, 22, 33, etc.

In trying the two methods the points of intersection do not agree in a 3 or 4 foot radius by 1 1-2 inches. What about a 10 or 12 foot radius? Although W. S. W. may be correct, his method would not be followed by the ordinary mechanic, owing to getting the transfer parallel lines from drawing board to the work at any distance away.

As kinks, short cuts and wrinkles are not guaranteed, we have to try them to see whether they are worth the booking for future use to show the youngsters.

How to Find the Proper Size Wood Beams for Various Spans

From E. H. Bentzel, Hampton, Va.—The tables in the March number of the BUILDING AGE, by W. A. Giesen, showing the proper size of wood beams for various classes of structure are very interesting.

Will you publish through the Correspondence Department the factor of safety these tables are based on?

I notice in the article he mentions the safe stresses of the different woods but does not mention the breaking stresses, so that I can not decide what factor of safety he used.

I am an instructor in carpentry at the Hampton M. & A. Inst. Va. and would like to use this information in connection with our classes in shop mathematics.

We give the carpenter students enough strength of materials so they can work problems with single beams and floor loads, in fact just a general insight in the subject so they will be able to appreciate tables like these by Mr. Giesen.

We also try to keep the trade students in close touch with good trade journals and the BUILDING AGE is the one used in my department.

Answer from W. A. Giesen, Architect, New York City.—In reply would say that the safe bending stresses used for long-leaf yellow pine was 1600 lb. to the square inch, spruce was 1200 lb. to the square inch, and short-leaf yellow pine was 1000 lb. to the square inch, giving a factor of safety of six. In other words, the ultimate or breaking stresses are six times the safe stresses. This would give long-leaf yellow pine an ultimate bending stress of 9600 lb. to the square inch; spruce 7200 lb. to the square inch and short-leaf yellow pine 6000 lb. to the square inch. It should interest Mr. Bentzel to know that oak, Douglas fir and white pine have the same bending stresses as spruce. Also that the bending stress for hemlock is half of that given for long-leaf yellow pine and further that tables Nos. 3 and 4 can be used for hemlock by taking ½ of the value given for long-leaf yellow pine. The ultimate bending stresses from which the safe stresses given in the tables were arrived at were determined by making a considerable number of tests of the various woods, the average of each group giving the ultimate stress.

THE EDITOR'S PAGE

Building Construction O.K'd by Secretary McAdoo

That the Government now realizes that building construction, even residential construction, is necessary to the industrial welfare of the country is evidenced by the following extract from a letter written by Secretary McAdoo:

"Where it is a question of building a new home simply because it would afford greater comfort the operation should not be undertaken. Where it is a question of need—be it on account of sanitary conditions or because without such construction other operations essential at this time for the welfare of the country would suffer—there is no doubt that the work should be undertaken.

"This applies equally to construction work in cities and towns and in farming districts."

This statement of Secretary McAdoo affords direct confirmation of the attitude which has been taken by these columns during the past. Our country is in the hands of a capable and efficient administration which can be thoroughly trusted to take the proper course, once important facts bearing upon the subject are brought up and thoroughly understood.

Don't Knock Your Own Business

Last week I heard a contractor talking about the high cost of materials. He spoke of how prices had advanced, how foolish a man was to build under present conditions and how he himself wouldn't think of it, how prices were bound to go down—and a lot of similar information. What effect do you think such talk would have on the man about to build?

I'll give credit to most of the builders whom I have met for a very real determination to make the best of the situation, to be a booster and not a knocker, to refrain from prognostications of the evil of building now, and to refrain from spreading the impression that prices are going to fall.

What position is the man in who held off from building on the first high price wave? At least he could get his materials then. Now?

Impressions in many circles are that this is going to be a long war. Why should a man hold off from building now, when three years hence the chances are that he will be worse off both as to prices of material and labor?

And after the war? The years of slow upbuilding to meet the accumulated housing needs of the nation, the reconstruction of Europe—do you think that this accumulated demand is going to lower prices? And then the shortage of skilled mechanics, whose ranks will be depleted by the Supreme Sacrifice. Can all this possibly foretell a lowering of manufacturing costs, of cheap and abundant labor, of lessened demand? No!

But it seems hard to believe that prices will not soon come down, such is human hopefulness. Yet there seems to be no sound foundation at present on which to base a logical feeling for lower prices.

WHY THE EDITOR IS GOING TO BUY A LIBERTY BOND THIS MONTH

What does the Third Liberty Loan mean to you? Just what it means to me, and that is this:

I'm not buying a bond for sentiment or through duty; I'm buying a bond because I want to help out my friends who have been selected for service. I want this war to come to a conclusion at the very earliest date possible, and I realize that every dollar that I loan to my friends will bring the end nearer.

I say that I loan my money to my friends. The money spent for a Liberty Bond is not going to the Government as an abstract ruling power. It is going to help keep Jim Smith, who lives next door to me, in good health. And it is going to make it possible for him to fight more effectively for the ideals which you and I both cherish.

Baker says we'll have two million men "Over There" this year. Those men include the chaps who've worked, helped, and played with me many a time. Do you think that I'm going to lay down on them? No, Sir!

I want my friends to come back as soon as possible. I want just as few more to be called to service as possible. But if we don't get behind our friends with our dollars this war will keep on till every man of us is on the fighting line, either industrially or at the front. Do you want things to come to this? I don't. It means too much suffering to all that I hold most dear.

That's why I'm going to buy a Liberty Bond this month. Are you with me?

In the meantime—why not boost the "Build Now" movement? Don't you see that every bit of knocking advice is a nail in the coffin of the trade?

An optimistic view may be all right most of the time, but it is the man who carries his umbrella on a cloudy day, in spite of the forecast of clear and colder, who keeps his shoulders dry.

Comparison Shows That Income Taxes Are Low

Now that the income tax bugbear is off our minds and returns properly filed, it is interesting and refreshing to see that we are not nearly so bad off as we might be. By comparing the tax levied here in the United States with that levied in England we find that:

In England the tax on incomes of $1,000 is 4½ per cent; in America, nothing.

In England the tax on incomes of $1,500 is 6¾ per cent; in America, nothing for married men or heads of families, and 2 per cent on $500 for an unmarried man.

In England the tax on an income of $2,000 is 7⅞ per cent; in America, nothing for a married man or head of a family, and 2 per cent on $1,000 of the amount for unmarried men.

The English income tax rate also increases more rapidly with the growth of the income than ours. A $3,000 income is taxed 14 per cent, $5,000 16 per cent, $10,000 20 per cent and $15,000 25 per cent. Our corresponding taxes for married men are respectively two-thirds of 1 per cent, 1½ per cent, 3½ per cent and 5 per cent. The tax is only slightly more for the unmarried, due to the smaller amount exempted, the rate being the same.

Prices Are Rising, Build Now

The past month has registered a number of price advances in lumber and other building commodities. The demand is keeping well ahead of the supply, for transportation difficulties, shortage of stocks and difficulty in getting men for the woods are all contributing to make the situation anything but pleasing.

Government requirements are, of course, being given preference. This source is affording manufacturers and wholesalers plenty of outlet for their stocks, which means that production is going to be kept well up in order to meet this demand alone.

We have heard much of England's "Building Ban." But in spite of her prohibition of high cost private building, over ten million dollars' worth of factories and workshops were erected during the first half of 1917. This is stated to be more than usual.

Hopes are being held forth that building operations in the United States will show increased activity now that spring has arrived. Freight shipments are expected to come along better, and in many quarters the outlook is optimistically regarded.

Building Activity Throughout the United States

THE building situation is continuing to improve, for the month of February, 1918, shows a loss of only 36 per cent as compared with February, 1917. This showing is especially favorable when we taken into consideration the fact that the figures are based mainly on construction in the larger cities. Construction in rural communities as well as the vast amount of Government building is not shown. Lumber manufacturers are finding themselves harder pushed than ever before, and there is plenty of demand for material.

Government housing schemes are going to make necessary the employment of thousands of workmen, together with a large demand for material. Private building is picking up, and the acute need for apartment buildings, office buildings and private residences is felt in many quarters as likely to result in a fair amount of activity during this coming season.

Of 125 cities reporting, 88 show a loss as against 37 reporting a gain. Cities located in the Eastern States report particularly unfavorable conditions. The loss is 41 per cent, 38 cities contributing to this end out of 47 reporting.

Cities located in the Middle States show a loss of 31 per cent, 26 out of 40 cities reporting decreased activity.

Southern and Western cities make a better showing, the percentage of loss being 29 and 28 per cent respectively. Of the 19 cities reporting in each of these sections of the country, 13 show a loss as against 7 reporting a gain.

CITIES IN EASTERN STATES

	February, 1918				February, 1917			
	New Work		Repairs		New Work		Repairs	
	Permits	Value	Permits	Value	Permits	Value	Permits	Value
Albany N. Y.	95	$139,600	...	....	76	$300,740	...	....
Allentown Pa	10	11,250	...	....	16	46,925	...	....
Altoona Pa	12	7,299	...	....	11	14,428	...	....
Atlantic City N. J	61	56,318	...	....	80	194,912	...	....
Bayonne N. J	4	4,450	...	....	13	69,450	...	....
Binghamton N. Y.	81	39,501	...	....	147	156,931	...	....
Boston Mass	15	360,650	142	134,056	93	2,176,405	229	$392,891
Brockton Mass	...	....	5	4,850	13	30,100	8	5,900
Buffalo N. Y	133	411,500	24	81,500	123	469,000	...	....
East Orange N. J	7	24,400	...	....	25	137,994	...	....
Elizabeth N. J	7	20,250	...	....	14	58,075	...	....
Erie Pa	25	30,025	...	....	78	138,315	...	....
Harrisburg Pa	5	181,900	...	....	12	10,895	...	....
Hartford Conn	30	37,395	...	....	50	144,010	...	....
Haverhill Mass	...	16,000	...	....	...	11,600	...	....
Hoboken N. J	2	7,250	9	12,015	2	72,000	2	2,100
Holyoke Mass	4	1,070	...	....	16	77,000	...	....
Lawrence Mass	2	10,000	6	2,820	10	54,000	7	17,300
Manchester N. H	15	23,453	...	....	28	61,625	...	....
Mount Vernon N. Y	5	28,800	7	4,075	21	128,400	8	5,700
Newark N. J	82	298,976	...	....	148	532,955	...	....
New Bedford Mass	13	41,400	...	....	20	228,950	...	....
New Britain Conn	8	120,475	...	....	29	179,775	...	....
New Haven Conn	28	678,195	...	....	52	133,186	...	....
New London Conn	33	625,800	77	35,598	43	47,550	144	108,784
New York:								
Manhattan	17	1,896,700	168	480,655	29	7,606 500	225	965,999
Bronx	804	661,398	...	....	187	586,334	...	....
Brooklyn	38	514,200	322	306,249	134	1,654,450	593	344,715
Queens	189	379,669	...	....	283	865,243	...	....
Richmond	30	89,820	...	....	48	318,262	...	....
Niagara Falls N. Y	12	87,875	1	2,000	5	50,275	2	1,000
Nutley N. J	1	2,000	2	660	...	....	3	500
Orange N. J	33	50,580	...	....	47	86,980	...	....
Passaic N. J	3	825	3	1,300	2	2,500	6	5,050
Paterson N. J	33	50,850	...	....	47	86,980	...	....
Philadelphia Pa	127	427,685	183	164,180	554	3,698,475	259	329,640
Pittsburgh Pa	40	345,099	61	69,589	64	162,007	77	79,528
Portland Me	9	20,075	...	....	12	24,550	...	....
Reading Pa	3	125	54	18,000	5	9,500	64	21,100
Rochester N. Y	19	23,150	32	80,650	54	147,775	44	94,086
Schenectady N. Y	6	665	5	9,150	9	270,630	11	14,975
Scranton Pa	6	3,865	...	....	20	24,028	...	....
Syracuse N. Y	7	24,800	32	20,110	23	178,440	31	23,292
Trenton N. J	10	4,600	...	....	20	550,845	...	....
Utica N. Y	3	10,500	...	....	13	30,750	...	....
Wilkes-Barre Pa	37	87,162	...	....	44	58,870	...	....
Worcester Mass	35	127,425	...	....	55	217,990	...	....
	2139	$7,985,025	1133	$1,427,457	2775	$15,106,605	1713	$2,412,560

CITIES IN EXTREME WESTERN STATES

	February, 1918				February, 1917			
	New Work		Repairs		New Work		Repairs	
	Permits	Value	Permits	Value	Permits	Value	Permits	Value
Berkeley Cal	26	26,500	20	10,000	28	80,000	46	14,300
Boise Idaho	1	2,500	12	3,855	2	10,000	15	5,615
Colorado Spgs Col	1	190	3	440	8	4,450	11	6,065
Denver Col	83	68,370	49	105,250	128	207,600	86	40,920
Fresno Cal	49	80,181	59	24,378	50	121,960	49	10,795
Long Beach Cal	161	148,865	...	....	70	48,426	...	....
Los Angeles Cal	518	765,630	224	123,476	533	1,222,518	233	97,652
Oakland Cal	115	381,250	57	27,390	191	331,015	70	36,007
Pasadena Cal	22	32,470	38	12,293	45	82,503	54	11,824
Portland Ore	152	163,565	170	58,265	117	165,045	150	45,615
Pueblo Col	36	14,470	...	....	41	51,194	...	....
Salt Lake City Utah	26	35,510	...	....	30	64,900	...	....
San Diego Cal	35	41,840	67	23,425	28	41,205	60	24,475
San Francisco Cal	43	368,760	297	168,464	137	1,031,189	348	134,831
San Jose Cal	25	62,274	...	....	34	19,583	...	....
Seattle Wash	789	896,030	...	....	574	634,625	...	....
Spokane Wash	36	25,210	20	7,033	35	78,160	38	26,590
Stockton Cal	49	57,105	..	....	44	42,365	...	....
Tacoma Wash	143	196,709	...	....	117	77,207	...	....
	231,100	$3,368,729	1020	$565,669	2212	$5,033,945	1160	$454,749

CITIES IN MIDDLE STATES

	February, 1918				February, 1917			
	New Work		Repairs		New Work		Repairs	
	Permits	Value	Permits	Value	Permits	Value	Permits	Value
Akron Ohio	80	$154,035	32	$33,640	212	$927,145	47	$138,415
Canton Ohio	24	48,030	...	....	46	105,700	...	....
Cedar Rapids Iowa	3	57,000	4	9,000	2	10,000	6	30,000
Chicago Ill	93	2,376,000	333	143,755	309	3,657,900	560	....
Cincinnati Ohio	30	167,405	146	64,410	157	476,555	260	82,300
Cleveland Ohio	97	1,106,200	367	155,870	206	2,360,000	459	444,260
Columbus Ohio	46	90,255	45	68,255	60	113,755	37	109,900
Council Bluffs Iowa	4	8,450	...	....	7	9,350	3	1,350
Davenport Iowa	25	25,645	...	....	13	10,935	...	....
Dayton Ohio	49	664,914	...	....	378	1,932,090	...	....
Des Moines Iowa	30	54,850	...	....	109	226,160	...	....
Detroit Mich	102	739,660	78	117,920	505	1,905,055	151	199,415
Dubuque Iowa	3	35,030	...	....	9	19,400	...	....
Duluth Minn	13	163,950	21	25,145	26	126,815	30	22,220
East St. Louis Ill	18	15,950	...	....	23	240,853	...	....
Evansville Ind	13	56,980	16	7,300	27	30,548	47	19,740
Grand Rapids Mich	32	98,428	...	....	49	61,505	...	....
Indianapolis Ind	186	317,626	...	....	306	522,510	...	....
Kansas City Kan	10	25,100	...	....	42	50,500	...	....
Kansas City Mo	29	1,786,700	81	70,000	83	628,250	133	130,820
Lincoln Neb	12	31,605	...	....	28	66,565	...	....
Milwaukee Wis	69	335,619	...	....	78	403,844	...	....
Minneapolis Minn	137	253,095	...	....	165	323,805	...	....
Omaha Neb	44	163,600	...	....	52	936,925	...	....
Peoria Ill	14	82,100	...	....	19	153,691	...	....
Richmond Ind	2	15,000	9	3,100	...	....	3	90,000
Saginaw Mich	5	9,042	...	....	8	6,775	...	....
St. Joseph Mo	11	8,845	...	....	21	23,820	...	....
St. Louis Mo	121	214,156	248	147,148	186	714,917	262	191,624
St. Paul Minn	72	238,473	...	....	52	218,044	...	....
Sioux City Iowa	21	432,875	...	....	33	92,000	...	....
South Bend Ind	14	7,880	5	4,385	13	124,781	7	6,041
Springfield Ill	11	10,000	20	24,325	7	108,100	18	17,990
Superior Wis	28	141,720	...	....	16	9,395	...	....
Terre Haute Ind	22	8,060	...	....	28	23,060	...	....
Toledo Ohio	52	30,782	...	....	152	388,133	...	....
Topeka Kan	9	1,790	...	....	21	23,991	...	....
Wichita Kan	74	262,650	...	....	34	233,300	...	....
Youngstown Ohio	19	673,740	12	10,000	68	148,145	7	107,275
	1515	$10,913,240	1417	$884,253	3550	$13.756,417	2030	$3,372,360

CITIES IN SOUTHERN STATES

	February, 1918				February, 1917			
	New Work		Repairs		New Work		Repairs	
	Permits	Value	Permits	Value	Permits	Value	Permits	Value
Atlanta Ga	64	$242,684	85	$39,094	61	$447,155	85	$46,168
Baltimore Md	33	394,885	295	93,325	119	499,150	589	176,220
Beaumont Texas	29	55,560	32	16,082	13	22,173	48	19,457
Birmingham Ala	39	25,075	235	31,036	46	75,950	237	71,307
Charlotte N. C	6	7,535	8	5.290	34	74,440	...	....
Chattanooga Tenn	106	49,301	...	....	138	54,371	...	....
Corpus Christi Texas	9	11,325	...	....	14	8,005	...	....
Dallas Texas	36	86,549	28	61,509	71	338,375	31	30,967
El Paso Texas	186	468,525	...	....	71	88,905	...	....
Huntington W. Va	30	59,995	...	....	35	53,575	...	....
Louisville Ky	34	60,498	36	22,096	70	64,780	33	15,540
Memphis Tenn	62	95,505	...	....	141	246,785	...	....
Miami Fla	41	95,920	...	....	117	134,085	...	....
Montgomery Ala	98	12,272	...	....	129	15,430	...	....
New Orleans La	26	84,135	7	6,750	54	371,503	13	8,570
Oklahoma City Okla	98	258,315	...	....	65	163,998	...	....
Richmond Va	17	144,688	39	29,358	63	497,493	51	39,039
San Antonio Texas	201	569,965	...	....	154	154,277	...	....
Savannah Ga	16	30.265	...	....	31	93,600	...	....
Washington D. C	52	627,640	164	103,810	81	1,021,415	180	200,410
Wilmington Del	13	40,800	28	29.640	11	26,415	26	24,940
	1245	$3,446,653	957	$707,990	1518	$5,261,880	1293	$632,618

War Time Opportunities to Extend Your Business

Some Pertinent Hints That the Wide-Awake Dealer Will Act On

IN the large cities the effect of the war is to shut off the normal activity in building. The attitude of the Government and of organized business, as represented by the Chamber of Commerce of the United States, is that all activity that can have no favorable bearing on the successful prosecution of the war should be discouraged. Moreover, the scarcity and the high cost of labor are so pronounced that building operations in the large cities are unavoidably checked. An additional handicap to building activity in the larger municipalities is the unwillingness—perhaps it might better be termed inability—of the banks to finance building projects at a time when the country's financial resources are undergoing the tremendous strain of readjustment involved in digesting the second Liberty Loan and preparing the way for a third issue.

These facts are graphically shown in the building statistics of the country, gathered almost altogether in the cities, where building projects are encountering these and a multitude of other obstacles. Unfortunately, however, the publication of building statistics covering the cities is very apt to convey and, in fact, does often convey an erroneous impression of the conditions prevailing in the country at large, due to a lack of understanding of the relative importance of large city, small town and rural building. A few statistics may help to make this point clear:

It is estimated that about 55 per cent of the wood buildings in the United States are located in or contiguous to towns and villages having less than 5000 population, none of which towns or villages is to be found in any tabulation of building reports. On the other hand, considerably more than 50 per cent of the steel used in building construction is used in cities having more than 100,000 population. Nearly 60 per cent of the ready roofing sold is consumed in those small towns, villages and contiguous rural districts, while their consumption of slate and tile is negligible. They consume just about the same amount of paint, in the aggregate, as do the cities over 500,000 and about half as much paint as do all the cities over 100,000 population.

It is a striking fact that when one includes in the "small town" class all places up to 10,000, with their contiguous territory, he will find those "small towns" consuming nearly three-quarters of the country's entire output of ready roofings.

> **Unusual opportunities to develop profitable business are within the reach of the dealers and building contractors of the smaller cities and rural districts.**
>
> **A great amount of building in rural communities and cities of the smaller classes will await stimulation that dealers and builders can readily furnish by the dissemination of a few facts about building costs.**
>
> **Spring will find a host of dealers and builders busy to the limit of their capacity, but they will be the ones who have been far-sighted enough to go after the business and to make the necessary preparations to handle it after they get it.**

From these statements it will be apparent that a period of building inactivity in the larger cities that furnished the building statistics does not evidence a corresponding inactivity in rural building. These adverse factors are present in the cities and almost entirely absent or ineffective in the country:

1. Restrictions on labor growing out of union organizations and activities, with resulting increases in wages and reduction in output.

2. Prevailing shortage of iron, steel and other metals that figure heavily in large construction projects and concurrent high prices.

3. Speculative building not being regarded as necessary to prosecution of the war is opposed by the Government and the country's leading business interests.

4. The large banks that are bearing the brunt of the burden of financing the war are very reluctant to lend money—even if they are able to do so—to be used for any purpose not deemed to have some bearing on the conduct of the war.

The following factors, on the other hand, are to be reckoned with as influences stimulating rural building activity:

1. The intense need of an immense increase in farm productivity.

2. The almost equally intense need for a great increase in live stock production.

3. The manifold advantages — constantly increasing—of locating large industrial operations away from the big cities, in places where workers are brought less actively in contact with

those elements of social and political unrest that germinate much of the labor trouble found in metropolitan centers. This tendency is rapidly developing an acute housing problem which will be solved only by earnest attention to the requirements of such rural and semi-rural industrial communities and a large amount of carefully planned building.

4. The proper and commendable desire of the people who reside on farms and in small towns for better living conveniences, which they are now able to afford as never before.

5. The development of great areas of undeveloped and abandoned agricultural land, due to the high prices of farm products and a consequent "back to the farm" tendency on the part of people who see in such a move an opportunity to become financially independent.

A brief survey of the situation will show that unusual opportunities to develop profitable business are within the reach of the building contractors of the smaller cities and rural districts. Much rural building is going to be done because it is necessary. The farmer who finds himself compelled to build a barn or a silo to maintain the efficiency of his business and secure the benefits of prevailing prices on farm products is going ahead without being coaxed. But a great amount of building in rural communities and cities of the smaller classes will await stimulation that builders can readily furnish by the dissemination of a few facts about building costs.

The public has gained the impression that building costs have increased far beyond reasonable proportions. Sellers of building materials themselves have aided in the dissemination of this sort of misinformation by unwarranted and, in some instances, untruthful statements regarding the increases in cost of competitors' goods. Then, too, the public has been impressed with the startling figures given out from time to time showing the jump in steel prices and in the prices prevailing on some other commodities that enter into certain classes of building. But hardly anyone has taken the trouble to show that these facts are misleading; that farm improvements are relatively cheaper than ever before; that the ordinary moderate-priced dwelling house can still be constructed at reasonable cost, etc.

The farmer can convert grain, cattle or hogs into buildings on far better terms to-day than were possible twenty years ago. Anything he produces will buy more lumber or cement than it would a decade back. And ten or twenty years ago his business was so slightly profitable, as a rule, that the average farmer was hardly able to afford any improvements, while to-day he cannot afford to postpone the doing of a single thing that will enable him to produce and market on a larger scale.

The task of spreading the truth about the building situation in the smaller cities and towns and through the country rests with the contractors and dealers who sell the materials. They can command the aid of the rural press, which is a most potent influence in such work, by seeing that the facts are brought to the attention of every newspaper editor who is sufficiently interested in the welfare of his own community to appreciate the importance of giving publicity to the truth.

When the railroad situation is straightened out, as it will be within a few weeks, there will be a plentiful supply of lumber, cement and other materials used in ordinary construction. The lack of shipping facilities has resulted in the accumulation of great stocks of such materials at producing centers, the marketing of which will insure the reasonableness of prices. When spring arrives it will find a host of dealers and builders busy to the limit of their capacity, but they will be the ones who have been far-sighted enough to go after the business and to make the necessary preparations to handle it after they get it.

"We Are All in This War"

*By John Price Jones**

"We are all in this war."

Many times a day this phrase is used. You hear it in the home, in the schoolroom and in the club.

Business men and bankers when they meet casually on the street or discuss important affairs in their private offices find occasion to repeat it frequently.

But are we all in the war?

Do we who have not been privileged for one reason or another to don the khaki and shoulder a gun see the war with the vision of our soldiers?

Even with an ocean between them and the fields upon which their sacrifices will be made, they realize what it means to be "in this war" in all its seriousness.

And yet their situation differs from that of the civilian only in that they have sworn specially to support and defend the nation. Such a declaration of allegiance adds nothing to the obligation under which every citizen lives.

Those who have donned the uniform have a part to play different from those who have not quit the pursuits of peace, but the war should and does have the same personal meaning for all.

The American soldiers who have already been sent to France and those soon to follow know what is expected of them and how they are expected to perform their tasks.

There is just as much expected of those who remain at home. All of us realize this when we pause to contemplate the tremendous energies which have been put forth to prepare the nation to be "in the war" and be in right.

We have witnessed this splendid Government of ours organizing its vast resources on a stupendous scale—organizing its millions of young men into great armies; organizing its industries to produce the enormous quantities of ammunition and other supplies to support those armies in the field of battle; organizing its finances to pay the wages of the men who have been called upon to sacrifice, if necessary, their lives for the nation, and to purchase the supplies needed to afford those men the most protection possible.

At some point in the working out of this wonderful process of organization each of us, let it be hoped, has taken some part, however small, but have we done all that could be expected from us, even as our soldiers now in the trenches on the western front?

There are 10,000,000 people in the United States who can with pardonable pride boast that they own Liberty bonds. Fine! Whether they subscribed to the first or second loan, or to both, it helped—helped a lot. It was splendid.

But these same 10,000,000 people as well as the tens of millions more who have not yet experienced the pleasure of clipping coupons from the best security the world has to offer today will have another opportunity to buy Liberty bonds on April 6.

The Government needs billions of dollars more to carry out its war programme and finance its military activities to a successful conclusion.

When the Third Liberty Loan is offered to the public on April 6 we feel all, no matter how much, or how little, we have done heretofore, have another chance to show that we who must stay "behind the lines" are just as patriotic—just as anxious to do our part as the brave men who go to the front—will be given a chance to say truthfully:

"We are all in this war."

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*Assistant Director in charge Press Bureau, Liberty Loan Committee. Prepared exclusively for BUILDING AGE.

Scrap Lumber Can Be Used to Build a Swing

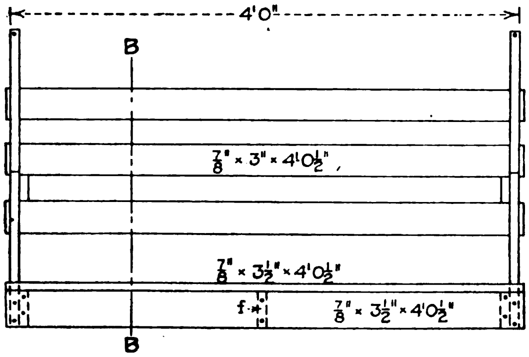
By W. S. Wilkin

IN the illustration is shown a swing which can be made from cheap lumber, that is, if there is such a thing as cheap lumber these days.

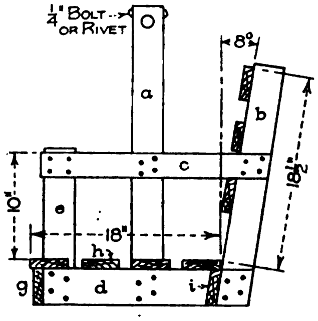
Most anybody can make the swing with a saw and hammer. The whole thing is constructed of straight ⅞-in. board nailed together. Run the piece up above the arms as shown in the sketch. This will steady the swing. Put a hole in the top end, run the rope through and tie a knot in it. Put a little bolt through the board edgewise to keep the rope from splitting it.

It can be made any length from about 2 ft. upward and makes a good cheap swing that will give lots of service. It can be made out of scraps of different kinds of lumber and then painted after being constructed.

This swing should not cost much more than $1 outside of the labor. About 15 ft. of lumber at 5 cents per foot totals 75 cents, and then the nails, 2 bolts, ¼ x 3½ in., and one coat of paint will do the trick, although to do the work right it should be primed and have two coats.



Front Elevation. Scale 1" = 1 ft.



Section on Line BB.

No. Pcs.	Thickness	Width	Length	Kind	For
6	⅞"	3½"	4' ½"	Y Pine	g, h and i
3	⅞"	3"	....	...	Back
2	⅞"	3"	2' 4½"	...	a
2	⅞"	3"	1'11½"	...	b
2	⅞"	3"	1'10"	...	c
2	⅞"	3"	1' 8"	...	d
2	⅞"	3½"	1' 2¾"	...	e
1	⅞"	3½"	1' 4"	...	f

Bill of Material for Swing

How the Lumber Dealer Can Profitably Handle Small-Lot Sales

EVERY building material dealer is acquainted with the old and well-tested practice of advertising "leaders" at low prices to bring customers to department and dry goods stores. The customer who comes to buy a bargain usually stays to buy other goods at regular prices and thus many profitable sales are made. In the building material field this plan of building business has not generally been regarded as feasible, for the reason that as the business is commonly conducted, the small sale usually involves trouble and expense out of proportion to the benefits the dealer may expect to derive from encouraging this sort of business and the sale of a few pieces of lumber or a sack of cement does not readily lead to a larger and really profitable sale of the sort the dealer is anxious to make.

There is a way, however, by which the dealer can make a profit out of small sales and at the same time turn them into a decidedly strong business-building influence. And the plan does not involve much expense or trouble, beyond a special arrangement and assortment of stock that is most frequently called for by customers.

Anyone who has tried to buy a few pieces of lumber in the average community knows that it is easier to purchase a piano or a house and lot—simply because the average lumber dealer has no facilities for convenient handling of such business. Yet every house owner has occasion to use a little lumber now and then—perhaps a few boards to make a window box or for repairing a fence, sometimes a piece of molding or a couple of 2 x 4's. In the large cities such purchases are made with very considerable difficulty and the customer, even if he gets what he wants, usually goes away with the uncomfortable feeling that he has made a nuisance of himself; and that means, of course, that he carries away some resentment against the dealer who showed a little too plainly that such business was not wanted. It was out of this situation that the department stores in some of the large cities were able to evolve a profit out of the sale and delivery of certain items of lumber, moldings, etc., at prices that on a per-thousand basis seem almost exorbitant.

The importance of retaining the good will of every possible customer is too well known to need any discussion here. The man or woman who is in the market for a board or two to-day may be ready to build a house or barn next month. And the absence of a friendly feeling toward the dealer, based on a little good service in small matters may send that home or barn bill to a mail-order house.

A comparatively small assortment of stock in the way of lumber, molding, lath, roofing material, cement, etc., will take care of the ordinary demands of this class of trade and can be efficiently and conveniently placed where the customer can look it over and make his selections without having to travel all over the premises while single pieces are being removed from lumber piles and bins. The experience of the average yard manager will form an adequate basis on which to lay out a department of this sort. A neat rack should be constructed for the storage of strips, moldings, short length boards, etc., and each compartment of the rack should bear a price mark in plain figures applying to its contents. This sort of material should be sold at so much per piece or by the linear foot—not in any case on a board measure basis, except when the purchase is large enough to justify taking it out of regular stock. The assortment should include material for making shelves—such as are put up in

clothes-closets, bathrooms, kitchens, etc. —book-racks, rough tables, medicine-chests and other such things that the average person sometimes prefers to make for his own use; also picture molding, plate rail, chair rail, and other commonly used moldings. Short scantling and an assortment of short strips of various widths, and a stock of cement will complete the stock of the "Odds and Ends" department. The softwoods carried in this stock should be of varieties that are easily worked, such as white pine or soft shortleaf, and clear material will be found to give most satisfaction for the average buyer's use, even at a considerably higher price.

In the case of the dealer who operates a light motor truck, small purchases of this sort may well be delivered a reasonable distance, but a nominal charge to cover delivery cost may properly be made and will not be resented by fair-minded customers, particularly if they are tactfully made to understand that this business is handled as a matter of accommodation and not because there is a profit in it.

The dealer who puts in a special stock of this sort and who has a good power rip saw can make a profit by cutting up some of his stock, raising the grade on a piece here and there by cutting out a defect and throwing the resulting strip into the small lots rack. He can also use a larger percentage of short lengths, because much of this business will call for pieces of a length that the customer can conveniently carry away.

Every accommodation sale should be rung up on the cash register if possible. The practice of charging and billing these small sales involves an unwarranted expense and one that can be readily dispensed with if the dealer chooses. A well displayed card sign announcing that prices on small lots are strictly cash will help to secure payment without giving offense to the customer.

The dealer who puts in a department of this sort should make use of it as a means of attracting people to his establishment. He should advertise it and in doing so he should bring out prominently that he is operating a store at which goods are sold just as they are at the drug store or the hardware store. The term "lumber yard" is unfortunate in its effect on many customers. It still conjures up pictures of the old-time lumber establishment, noted for its sawdust-covered floor, unclean cuspidors, cobwebs and generally disreputable appearance. That type of lumber yard office has passed in most communities, but many people are not aware of the fact. Impress on them that a building materials store is another thing altogether and it will occupy a much higher place in their esteem. Of course, a good show window will go far toward accomplishing this if the establishment is located where such a method of advertising is feasible. Such goods can then be displayed with prices shown and helpful suggestions as to the many handy things that can be made out of them at very small cost.

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The Motor Truck Is an Efficient Aid to the Dealer

THE advantages of the motor truck for haulage purposes is too well known to require extended comment in these columns as the extent to which it is being utilized by contractors, builders, retail lumber dealers, builders' supply men and others is strong testimony as to its merits for the purpose named. In connection with the motor truck, bodies of various kinds are utilized, and in the accompanying pictures we show a body which has been designed primarily for the use of building supply dealers and contractors of the country.

The picture designated as No. 1 shows a body as made by the Sterling Motor Truck Company, Milwaukee, Wis., which can be used for transporting light bulky articles or for coal; picture No. 2 shows a body which can be used for crushed stone, etc.; No. 3 shows a body with tailgate down, so that such things as lengths of lumber can be readily hauled from place to place, while No. 4 shows a regulation platform body which can be used for hauling articles of large dimensions.

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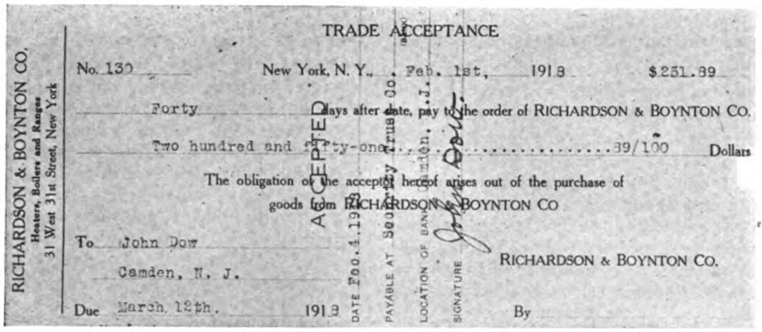

RICHARDSON & BOYNTON CO.
Heaters, Boilers and Ranges
31 West 31st Street, New York

TRADE ACCEPTANCE

No. 130 New York, N. Y., Feb. 1st, 1918 $251.89

Forty days after date, pay to the order of RICHARDSON & BOYNTON CO.

Two hundred and fifty-one ....89/100 Dollars

The obligation of the acceptor hereof arises out of the purchase of goods from RICHARDSON & BOYNTON CO

To John Dow
Camden, N. J.

Due March 12th, 1918

ACCEPTED
DATE Feb. 1. 1918
PAYABLE AT Security Trust Co.
LOCATION OF BANK Camden, N. J.
SIGNATURE John Dow

RICHARDSON & BOYNTON CO.
By

The above is a fac-simile of a trade acceptance. This is sent with the bill of goods by the seller to the buyer, the terms of payment being agreed upon in advance. The buyer "accepts" by writing across the face the name and location of the bank at which it is to be paid (generally the one in which he has an account) and his signature. The acceptance is returned to the seller, who can have it discounted if desired. It should be noted the buyer acknowledges the purchase, which places the obligation beyond dispute, and a definite time is fixed for payment

You Will Probably Run Up Against the Trade Acceptance Soon

Its Value, Uses, and Effects on Business Are Explained in This Article. *By Edwin L. Seabrook*

IT IS estimated that in this country there is approximately $4,000,000,000 of capital nominally tied up in unsettled ledger accounts. To a certain extent much of this is "dead capital." Within the next few months a third Liberty Loan will be floated and before the first of next June something like $3,000,000,000 of income taxes must be paid out of the profits of business for 1917. Considering these three facts, the financial system of our country will probably be tested by a strain as severe as it has experienced in a generation.

To offset this strain an innovation, or reform, is taking place with the returning use of the "trade acceptance" as a business instrument. Since the Civil War American business has been conducted on the "open-account" system, although trade acceptances were in general use prior to the middle of the last century.

It was to meet these financial strains, or the demand for more currency than the old method provided, that the Federal Reserve Bank was created. This bank can issue its notes (paper money) against 40 per cent gold and 60 per cent commercial paper. The very safest form of commercial paper is the trade acceptance because it is an acknowledgment of an indebtedness for merchandise purchased. Something of value has passed from one party to another, the indebtedness of it being acknowledged, therefore it is considered safe by the Federal Reserve Banks to issue currency against such merchandise, the indebtedness for which comes to the bank in the form of a promise to pay by the trade acceptance. By this method money stringencies will not only be relieved, but largely prevented.

The Federal Reserve Bank, local banks, manufacturers, wholesale houses and credit men's organizations are strongly advocating the settlement of accounts by the use of the trade acceptance. When such tremendous influences are agitating this method of settling open accounts it is surely worth the serious consideration, and a thorough understanding, of all those engaged in the building business.

Despite all that has been written in the trade papers, this method of settling accounts seems to be far from understood by many well-to-do firms and there is a hesitancy in adopting it. Perhaps the term "trade acceptance" will be much better understood if the difference between an open account and one that is closed by some form of settlement, whereby the obligation of the buyer cannot be disputed, is recognized.

Under the open book account there is no form of acknowledgment on the part of the buyer that he owes the account. Sales are billed thirty, sixty days, etc., but this often means little or nothing. It is a promise that neither party to the transaction really expects to be fulfilled. The buyer has possession of the merchandise and he can settle a thirty-day invoice in sixty days, or at any time suiting his pleasure or convenience. It is, therefore, apparent under the open book account that the seller is practically compelled to act as banker for the buyer, either by advancing the goods on his own resources or his own bank credit. Economically this is unsound, because the buyer should finance himself. An open account, therefore, so far as the seller is concerned, is "dead" capital in a certain sense.

Another defect in open book accounts is that as an asset these are too indefinite and not a sufficient basis of credit standing or rating to the seller. A merchant going to his bank for a loan with assets chiefly represented by open book accounts is handicapped because these are without specific acknowledgment on the part of the buyer. Bankers are well aware that it is one of the easiest things in business to dispute an open account.

No one in business will loan money without a written acknowledgment of the specific amount due and naming a time and place of payment. In England, France and most other European countries merchandise is bought and sold upon practically the same terms that money is loaned. An instrument given by the buyer acknowledges the obligation arising out of the purchase of the merchandise and fixes a definite time and place for payment. This is the trade acceptance.

No Open Accounts in Europe

There are practically no open accounts in European countries. A buyer never thinks of asking the seller to charge the purchase on an open account with no other evidence to show the indebtedness. He takes it for granted that the seller will "draw" on him for the amount payable at a date agreed upon; he will promptly "accept" the draft and return it at once to the seller. No other method would be used except for cash.

In France trade acceptances are discounted at the banks in amounts as small as $1. Practically one-half of the paper discounted in that country is for amounts less than $20, averaging thirty days. When the war broke out the Bank of France had $1,000,000 of five-franc ($1) trade acceptances which it had discounted.

Trade Acceptances Negotiable

Trade acceptances being negotiable paper and discountable at the banks, become "live" instead of "dead" capital as represented by open book accounts. Representing current transactions these furnish a circulating medium which will prevent money stringencies and panics from which this country has suffered so often and so disastrously.

One of the Governors of a Federal Reserve Bank states that England, with her one hundred to one hundred and fifty millions in gold, is able to transact business that this country is unable to do, or afraid to do, with a billion of gold. The reason for this is that since the establishment of the Federal Reserve system it has had only about $300,000,000 of bankers' acceptances, while England always has from $1,000,000,000 to $1,500,000,000. This means that the English merchants turn their trans-

actions into currency by using the trade acceptance.

Objections

Many firms are hesitating about adopting or urging the use by their customers of the trade acceptance. This is due in a large measure to the fact that the buyer will be reluctant to give a written promise to pay a definite amount of money on a certain date. It should be borne in mind, however, that this promise in writing is given before the bill is due and differs radically from an overdue account or disposing of a sight draft used to secure payment of a past due account, both of which are indications of credit weakness.

A large number of firms were recently questioned as to their experience in using the trade acceptance. None who had attempted its use found them impracticable. Many replied that they now have little difficulty in inducing their customers to give this form of settlement. Some reported, however, that they gave a special trade acceptance discount. It may be well, however, to guard against giving any concessions, because the object is to make prompt settlement universal rather than dependent upon a discount concession. A number of firms questioned seem to indicate that it is the general practice not to send acceptances to customers who are in the habit of discounting. One firm said they sent out 10,000 trade acceptances in two months and only three objections serious enough to be placed before the general manager were received. This gives some evidence of the growing popularity of the trade acceptance.

Undoubtedly it will be hard to break through a practice of fifty years' standing represented by the open account system. This will apply to the customers of those engaged in the building business as well as those who buy from manufacturers and jobbers. The advantages accruing to buyer, seller and business in general will undoubtedly influence this form of settling accounts. These are mutual to buyer and seller, because every buyer, unless he is an ultimate consumer, is likewise a seller.

Advantages

Each transaction is in effect completed by a virtual payment upon receipt of invoice.

Open book accounts are eliminated and in their place are bills receivable, which command a lower rediscount rate at the Federal Reserve Bank than any form of commercial paper.

It will put a stop to the practice of taking unearned discounts—a petty, unfair practice by no means uncommon.

A larger volume of business can be transacted on the same amount of capital.

It will lessen interest expense and make for economy in collections.

All orders will be legitimate, which will insure more careful buying, prevent overstocking and an accumulation of bad accounts.

It will insure prompt payment and cut down credit risks.

The giving of a trade acceptance on the part of the buyer shows his intention to pay promptly and is a good indication of the soundness of his credit. The habitual acceptance by the buyer will thoroughly establish his credit and increase his buying capacity.

It will have a tendency to assure the honest buyer that the unfair buyer shall not have unfair advantage over him through the abuses of the discount system.

It will eliminate much of the expense of collecting that is now necessary by the open-account system.

General Effect on Business

These are some of the advantages that will accrue to seller and buyer, but there are others that will be shared in by all business in general. Business will be stabilized, a better line of credit given by the bank, the lending power of banks increased, bank credits scattered, failures due to over-buying and accumulation of bad accounts will be eliminated. The business of banking will be given to bankers by eliminating the carrying of accounts by the seller.

Money stringencies will be prevented because trade acceptances can be rediscounted by the Federal Reserve Banks. When this is done Federal Reserve notes are issued against them, which really means that amount of additional money is immediately put into circulation. How much business will be quickened by converting a dead account on the books of the seller into actual money circulating through the community must be apparent to every one. When the trade acceptance is paid the Federal Reserve notes issued against it go out of existence and the obligation ceases to exist because the trade acceptance is discharged.

How the Building Trades Can Use the Trade Acceptance

The advantages claimed for the use of the trade acceptance between the manufacturer, wholesaler and retailer will also accrue to those engaged in the building trades if insistence on its use is urged upon the customer of such. Building construction work, including minor contracts and jobbing, is proverbially slow pay. Probably one of the greatest reasons for this condition is that those doing the work are poor collectors and do not fix a definite time for the payment after the work is completed or during its performance.

It is not necessarily implied that those engaged in the building trade should discount the trade acceptances received, but the great advantage in one having these would be to put his accounts in such liquid and definite form as to make them available for prompt use when necessary. If one secures trade acceptances he can arrange for the payment of his own accounts at a definite date and be able to meet them.

It is not to be expected that the old method of dead accounts will be quickened into a living form at once. Reforms in the very nature of things must and do come slowly. Time is necessary as well as education. Radical changes in business methods are taking place quickly, and there is no better time than now to inaugurate the settlement of accounts by the trade acceptance system.

A Chat on Wood Grades

By C. E. Davidson

As all are aware it was only a short time ago when Building Age devoted its columns almost entirely to carpentry and building, but recently it established a Dealers' Department and has permitted us lumber retailers to come in "and take a back seat" —on the back pages, where, naturally a newcomer belongs. We hope we shall not intrude. Since the Building Age has become, in a way, more cosmopolitan, we retailers are reading the carpenters' department and have become very much interested. We hope they shall become equally interested in our department. The whole industry is so inter-allied that we all no doubt shall receive much benefit.

As a lumberman, I have observed that carpenters cannot gain a perfect idea of the various grades, and am not surprised, because of the fact that nearly every wood has its own peculiar grading rules. But, primarily, all lumber is first divided into "clears" and "commons." There are generally two, or in some instances three, grades of "clears," and nearly all lumber has at least three grades of "commons."

All clear lumber and No. 1 common should be perfectly manufactured—that is, cut to its proper dimensions, and the thin lumber and other defects in manufacture dropped into No. 2 common and lower grades. Lumbermen often speak of common lumber as being either No. 1 or No. 2, and the public, mistaking this in some instances, think he means the lumber is without blemish, etc. The lumbermen, if they mention grades at all should say No. 1 common, not No. 1, to avoid a wrong impression.

But, each lumber, from its nature, has different grading rules, and only years of handling will acquaint a person with all the fine points.

Another thing of interest is that every wood has its good points and its poor ones. None is perfect.

Perhaps "the good old white pine" was

the queen of them all, though white pine with sap growth is of very short life. It has been said, so popular was white pine, that if it rotted, the weather was blamed, but if any other wood rotted the wood was blamed. It was always easy to work, and therefore a prime favorite. But, alas, it is passing out to a great extent.

Yellow, or Southern pine, has its distinct grading rules. At the start it should be understood that there are three Much of the pine which grows along the Gulf for an area of about seventy-five miles back is called by lumbermen long-leaf pine. It has little sap, is almost all heart, and is a very strong and durable wood. It is, however, very "hard" and full of resin. The pines which grow farther north of this area are largely short-leaf and loblolly, with softer and less resinous wood. The clears in this lumber ar very fine for finish, while the common grades contain many defects, principally many knots. It is also subject to sap stain, which is created by a fungus, if not properly handled.

Of the Western woods in general use we have the Idaho and California white pines, which are taking the place in a large measure of the old white pine of other days.

The Redwoods of California grow along the coast, mostly, and are said to be the oldest trees in existence. This wood is a most beautiful one, easy to work and most enduring. Many will perhaps be surprised to learn that this wood will repel fire to a wonderful extent, because of an acid which it contains. However, this acid also works to the detriment of this wood as to paint, and also as to iron.

Fir is one of the coming woods of the future. There are countless billions of feet of it in the far West yet uncut. It is noted for the fact that it is very strong and free from knots and other defects. Some carpenters do not like to work it because of an apparent grit, buit it takes a remarkably fine finish and is about as attractive as oak when properly rubbed down and finished in the natural.

I had not intended to overlook red cypress, which grows along the Gulf coast. It is noted for the fact that it will last longest in damp places. Really all sub-sills in all buildings which touch brick or concrete should be made of this wonderful wood. It resists decay to a remarkable degree. Its manufacturers take delight in calling it "the wood eternal."

There are of course many other woods of much value which I will not attempt at this time to discuss, but those mentioned are the ones which are principally carried by retail lumber dealers and with which we have most to do.

AS SEEN BY THE MAN ON THE ROOF

THE EXCEPTION TO THE GOLDEN RULE

"A man can't help but make a success in any enterprise," said the pastor, "if he just follows the Golden Rule."

"I don't know about that," replied his parishioner, carving off a little more of the white meat. "Our building material man failed because he had altogether too much due unto others in his business."

DISCONTENTING TO-NIGHT

The rain had been pouring steadily into the leaky tent for an hour.

"Now," said the rookey, "I know what they meant by in-tent-sieve training."

YES, INDEED

The contractor's life is full of ups and downs. When he isn't trying to get some new customer to pay something down, he is out trying to get some old customer to pay something up.

THE GET-TOGETHER SPIRIT

"Has the Home Building Club in the Clancy neighborhood done anything to stimulate house building down your way?"

"Sure. At the first meetin' they put shanties on three fellow's eyes."

HUMANITY, NOT HUMILITY

"This must be a very religious community. Every man I see going along has down-cast eyes."

"That isn't due to higher thought. It's higher skirts."

HEAVY CARGO

Bride—"I am afraid the ship that I sent those cookies to Jack on has been sunk."

Father—"Maybe they are what sunk it."

DEAR OLD COLLEGE DAYS

Boss—"What did that college chap say when that 12 x 12 fell on him?"

Bill—"When he came to he just asked, 'What "down" is it?'"

AS IT WERE

The boy whose job it is to open the office in the morning may be said to have the key to the situation.

HARDLY

"Does your daughter entertain many guests?"

"No, she sings for them."

CAL THE CARPENTER SAYS:

"Friendship is a sleeping porch that only a few occupy in winter."

"The spiritualist may like his slate medium, but not me mine."

"For hewing your way to success, use the adze."

"Some jobs go about as quick as a sermon."

TIME TO ROUSE THEM

Greene—"The country does not seem to be thoroughly awake on this war matter."

Browne—"Perhaps there have been too many war sermons in the churches."

THE LAZY LYRE

Mother—"I am awfully worried about that boy of ours; he is so frightfully lazy."

Father—"Never mind, Mother. Maybe he'll grow up and make a lot of money writing this 'free verse.'"

ONLY ONE—ONE MORE

Visitor—"How many rooms does a woman generally want in a dwelling?"

Builder—"One more than it has."

IT'S BETTER TO SEND FOR THE PLUMBER

"If you wish a thing well done, you must do it yourself," said the poet.

"Not," said the householder, "if it is fixing a leak in the bathroom."

HE WHO HESITATES

Employee—"A man ought to stop and think."

Manager—"Yes, but not think too long."

CORNET PLAYERS, PLEASE COPY

Neighbor—"Is your daughter improving with her ukulele?"

Dad—"Yes, she doesn't play it nearly as much as she did."

NOR HAD NEIGHBORS THAT KEPT CHICKENS

"I saw by the paper to-day," said Mrs. Chinfast, shortly after they had retired for the night, "that over in China they sentenced a man to death by a new method."

"Uh, huh," said Chinfast, turning over.

"Yes, they kept guards around him night and day and made him go without sleep."

"Uh, huh," said Chinfast, trying the other side.

"And he died in nineteen days."

"Well," replied Chinfast, giving it up, "It must be he wasn't married, or never lived next door to a cornet."

LEFT AT THE SHOP

"Charge!" shouted the lieutenant. The plumber's assistant turned and started for the rear.

"Here," yelled the officer, "where are you going?"

"I've got to go back after my gun."

New Equipment That Will Interest Builders

A ROOF covered with concrete tile manufactured by machinery furnished by the Walter Concrete Machinery Company, 417 Saks Building, Indianapolis, Ind., is shown in Fig. 1. Tiles made by this process are said to be fireproof, stormproof, waterproof, and light in weight. The color they can be manufactured in includes cement gray, terra cotta and other shades of red, buff, green, etc. The material is a scientific combination of Portland cement and sand manufactured under a perfected process as follows: The operator places the pallet or base into the machine; turns the crank at right side so as to raise the pin which forms the hole in the tile; fills the mold with concrete; tamps it down firmly; forms the corrugated surface with a shaped smoothing tool; sprinkles the surface with finishing mixture, using a hand sieve for the purpose, and finishes the surface of the tile with the smoother. The crank at right is then reversed so as to lower the pin, and then by a single movement of the treadle the finished tile resting on the pallet is released and ready to set in the rack to dry.

Fig. 1—At the Left is a Roof Being Covered with Walter Concrete Tile

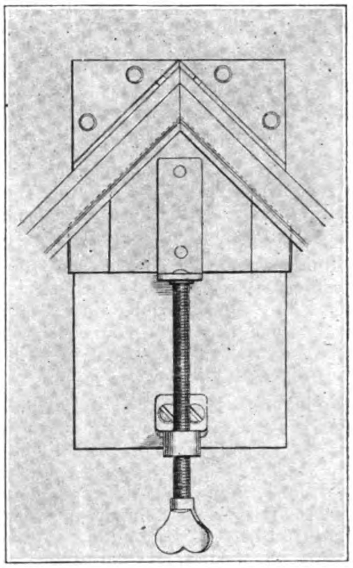


Fig. 3—At the Right is a Miter Clamp Manufactured by Geo. R. Reeves

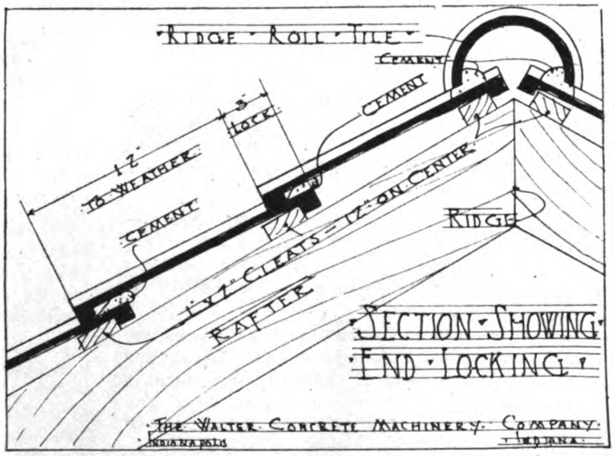


Fig. 2—Section Showing How Walter Concrete Tile is Placed on a Roof

The tile can be removed from the pallets after twenty-four hours, being then stacked in piles and left to cure. Four weeks elapse before the tile can be laid on the roof. An operator can make about 35 tiles an hour, the average cost per square being placed at $2.50, including materials and labor, this cost being compiled from representative plants now in operation. The manner in which the tiles are laid upon the roof is shown in Fig. 2. One by 2-in. cleets placed 12 in. on centers are nailed to the rafters, the tile being placed over as shown. Cement is then placed in between the joints as shown. A special ridge roll tile makes the ridge tight.

The miter clamp illustrated in Fig. 3 shows a clamp recently patented by George R. Reeves, 812 Wisconsin Ave., Oak Park, Ill. It is said to engage the mitered ends of two members and hold them in such fashion that they will not split when nailed together. The clamp has a frame plate upon which is mounted a sliding clamping plate, the frame plate being provided with flanges having notches to permit nailing. The clamping plate is formed in sections between which are secured holding spurs. The frame plate is formed on its longest side with an upstanding flange, and the two flanges converge toward the longitudinal center of the frame plate and are disposed at right angles to each other. The inner ends of the flanges meet at the center line of the frame plate, forming a closed angle. Each flange is provided with a transverse, upwardly-opening notch. Mounted so as to slide upon the frame plate is the clamping member. Lugscrews connect the plate and are threaded into the plates from the rear side of the frame plate in order to provide easy access to screws. In operation a pair of frame sections are positioned in the clamp, which is then tightened to force the miter ends of the frame sections into close engagement with each other. The spurs engage the frame sections and prevent any possibility of slipping when fasteners are driven into the sections through the notches. Much expense and trouble are often caused by the ends of the frame members splitting when secured by nails. This clamp is said to prevent this splitting action by

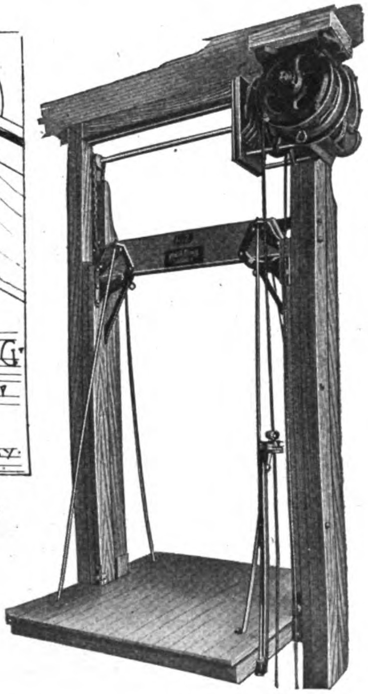


Fig. 4—A Hand-Power Elevator Can Be Changed to an Electric Elevator Through Apparatus Manufactured by the Kimball Bros. Co.

having the flanges form a closed angle.

A hand-power elevator changed to an electric elevator through apparatus manufactured by Kimball Bros. Co. of Council Bluffs, Iowa, is shown in Fig. 4. This represents a small elevator for retail store purposes, etc., or in places where it is not desired to handle a load exceeding about 1500 lb. The motor, controlling, and winding machine are all in one piece and can be attached to any hand-power elevator at a very small cost. This machine is controlled by a cable passing down through the current into the motor so as to raise the platform. By pulling up on the cable it will reverse the current and run the motor in the opposite direction and lower the platform. There is an automatic stop on the platform which the cables pass through. The elevator can be stopped at any floor automatically if so desired, and the elevator can be locked at any floor desired.

New Catalogs of Interest to the Trade

The Metal Shelter Company, 50 Church Street, New York City. Pictures, prices and specifications of various types of metal garages.

Specification for Slate Roofs for Flat Surfaces.—Vendor Slate Co., Inc., Bangor, Pa. Specifications in accordance with which slate roofs for flat surfaces should be laid. Illustrated by drawings showing construction.

Concrete Highway Magazine for March.—Portland Cement Association, 111 West Washington Street, Chicago, Ill. Is devoted to interesting information concerning concrete roads, and includes articles on "Thin Floor Slabs for Truss Bridges," "Building Concrete Roads on Grades," "Operating Cost of Highways."

Southern Beauty Enameled Ware.—The Cahill Iron Works, Chattanooga, Tenn. Catalog H, bound in cloth, illustrates and gives prices upon the various styles of plumbing equipment manufactured by this company, such as many styles of bath tubs, showers, child's baths, lavatories, Sitz baths, kitchen sinks, slop sinks, drinking fountains, closet tanks, supply and waste fixtures, faucets, etc. This catalog is too expensive to be distributed indiscriminately, but will be sent to interested builders.

Concrete Houses, Porches, Floors, Walks, Steps.—Alpha Portland Cement Company, Easton, Pa. Illustrations and plans of concrete houses, constructive details, miscellaneous information concerning concrete house construction.

Concrete Barns and Silos.—Alpha Portland Cement Co., Easton, Pa. Exteriors and interiors of barns and silos, plans and details of combination barn and silo built of reinforced concrete, suggestive information concerning concrete construction on the farm.

How to Make Concrete Posts.—Alpha Portland Cement Co., Easton, Pa. Valuable data along the lines indicated by the title, photographic reproductions and line drawings illustrating appearance and construction of posts.

Building a Concrete Garage.—Alpha Portland Cement Co., Easton, Pa. Plans and elevations of two small garages, together with bill of materials for the concrete work. Helpful suggestions for building are included. Pictures of small concrete garages.

Any of these catalogs will be furnished by the manufacturers. Or, if you prefer, we will see that you receive any that you desire. Just check the catalogs you want, tear out the page, and mail it to Building Age, 243 West 39th Street, New York.

Blue-print Reproductions of Various Kinds of Concrete Construction.—A very valuable set of details for concrete steps and porches, foundations, barns, retaining walls, small buildings of reinforced concrete, driveways, boat landings, sidewalk construction, ice houses, milk house, dams, smoke house, curb and gutter, hog houses, silos, watering troughs, manure pits, chicken house, greenhouse, corn crib, hotbed.

Rex Slate Surfaced Roofing.—The Flintkote Company, 98 Pearl Street, Boston, Mass. Folder describing and giving miscellaneous information concerning Rex Slate Surfaced Roofing.

United Electric Lighting Plant.—United Engine Company, Lansing. Mich. Describes and illustrates electric lighting plants especially adapted for rural homes.

Expansion Shields and Fasteners for Concrete, Masonry, Stone, Metal and Wood.—Savage Expansion Bolt Corp., 9 Desbrosses Street, New York City. Describes and illustrates various types of expansion bolt shields.

The Modern Way Up.—The Bessler Movable Stairway Company, Akron, Ohio. Describes and illustrates movable stairways, gives prices and affords data on construction.

Ribplex.—Mellor & Hamburger, 103 Park Avenue, New York. Describes and illustrates an expanded metal with ribs for roofs, floors, walls, ceilings and partitions.

Link-Belt Electric Hoists, Book No. 246.—Link-Belt Company, Philadelphia, Pa. Illustrates and describes various types of electrical hoists intended for overhead hoisting and conveying.

Circular for Dealers.—The Beaver Board Companies, 57 Beaver Road, Buffalo, N. Y. Gives valuable data for the increasing of beaver board business by the dealer, including sample ads, etc.

The Aislelite.—The Brookins Company, Euclid Avenue and East Eighteenth Street, Cleveland, Ohio. Describes, gives photographic reproductions and reasons for installation of the "Aislelite," which illuminates the aisles of darkened theatres. General specifications are given.

The Carter Times, February.—Carter White Lead Co., Chicago, Ill. A little magazine devoted to information upon painting. Gives valuable information concerning getting new work.

Pyrobar Reinforced Gypsum Roof Tile and Ornamental Tile or Slate Covered Roofs.—United States Gypsum Company, 205 West Monroe Street, Chicago, Ill. Describes and illustrates a fireproof roof covering a sheathing to which the finished roof is applied.

The Level You Need.—S. Robert Jackson, Watertown, N. Y. Describes and illustrates levels for carpenters, masons, bricklayers and others.

One-Pipe Modern Andes Hot Air Furnace.—Phillips & Clark Stove Co., Inc., Geneva, N. Y. Folder describing construction of this one-pipe furnace.

Do International One-Pipe Heaters Heat?—International Heater Company, Utica, N. Y. Testimonials from various sources showing the results which this heater has achieved in usage.

Excelsior Rust Proof Wire Fences. Published by the Wright Wire Co., Worcester, Mass. Describes and illustrates wire fences, trellisses, etc., manufactured by thi company.

Gold's Thermostatic Heat Regulating System. Published by the Gold Car Heating & Lighting Company, 17 Battery Place, New York City. An illustrated booklet pointing out the benefits of temperature regulation, together with a description of the regulating system manufactured by this company.

Builders' Hardware. Published by the H. B. Ives Co., New Haven, Conn. A booklet illustrating and describing some of the builders' hardware manufactured by this company.

Three Point Support Grant Hanger. Published by the Reliance-Grant Elevator Equipment Corp., 40th Street and Park Avenue, New York City. A folder describing several types of sliding door hangers manufactured by this company.

BUILDING AGE

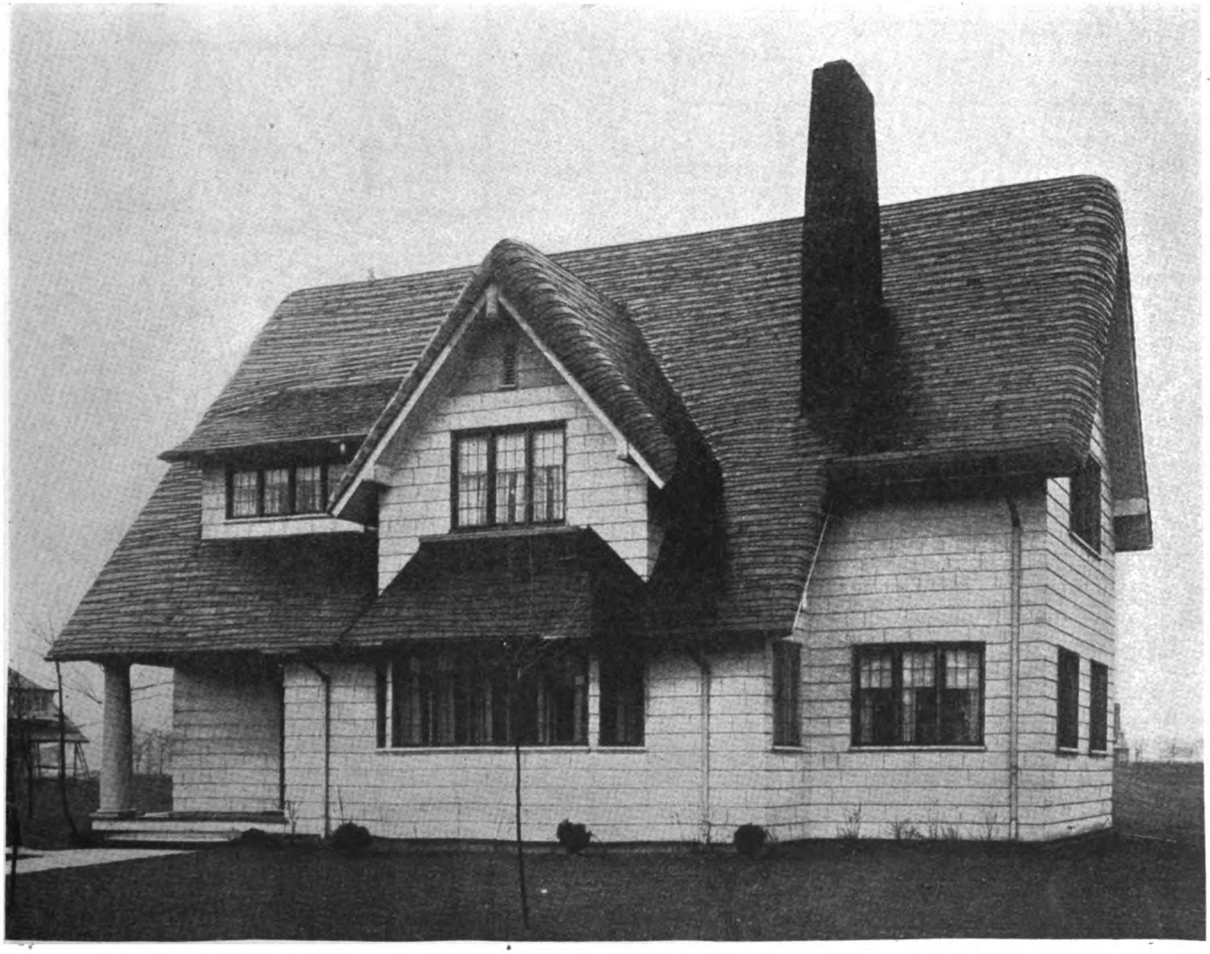
New York, May, 1918

The Thatched Roof Effect Used on a House Built at Cleveland

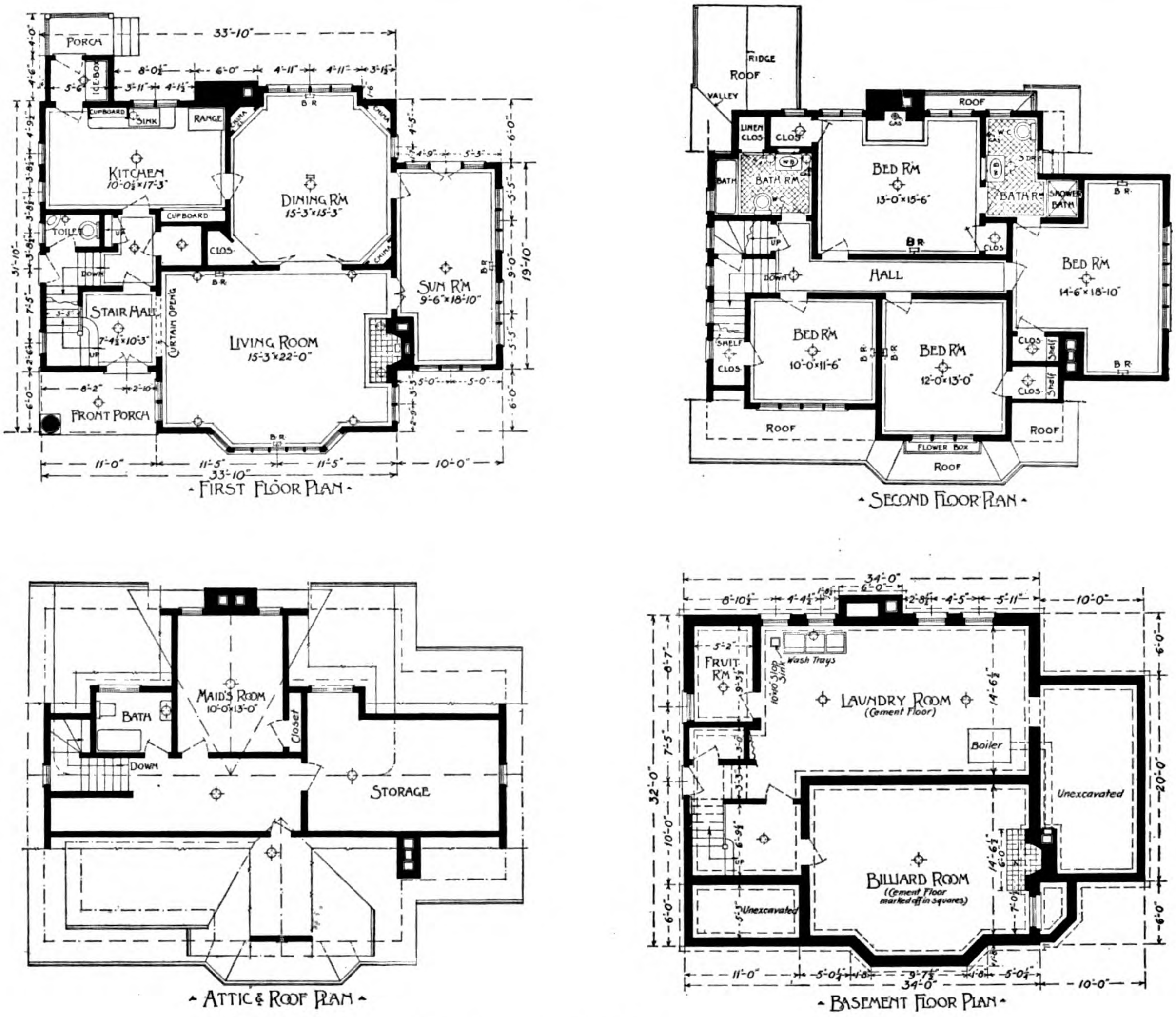
ONE of the most charming features of old English cottages is the soft line obtained by the thatched roof. Modern architects realize that the soft, irregular line is frequently capable of exercising more charm than absolute straightness and angularity.

The thatched shingle effect, which is rapidly gaining in popularity because of these reasons, is exemplified in the residence of Mr. Stahl. In fact, the quaintness and charm of the roof covering of this house forms one of the most attractive features of the design.

The main house walls, as well as the roof, are covered with Creo-Dipt shingles. Entrance is had from a small front porch into a stair hall, which communicates with the living room, and with the kitchen and cellar through a small hallway. The arrangement of this little hall-

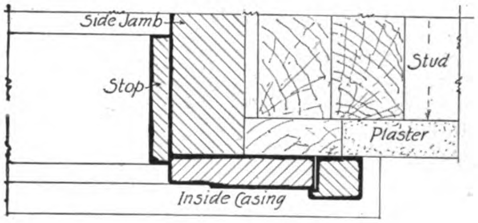


Residence of Mr. H. A. Stahl at Cleveland, Ohio. Robinson Greene, Architect

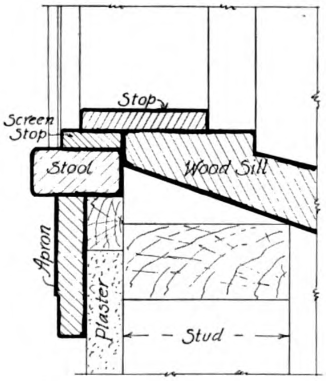


- FIRST FLOOR PLAN -
- SECOND FLOOR PLAN -
- ATTIC & ROOF PLAN -
- BASEMENT FLOOR PLAN -

Floor Plans. Scale, 1/16 in. = 1 ft.

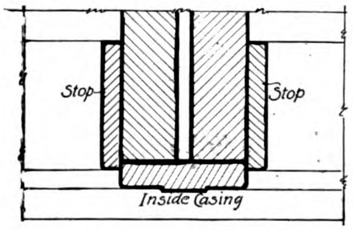


3-in. Detail of Side Jamb



3-in. Detail of Sill

¼-in. Detail of Wainscot Cap



3-in. Detail of Mullion

3-in. Detail of Picture Mold

3-in. Detail of Base

way is rather interesting, and it communicates with the outside of the house at the left by a grade door.

The living room is of good size, being 15 ft. 3 in. by 22 ft. in dimensions. The main features of this room are a large fireplace and a bay window. Crittall casement windows were used in this room and throughout the rest of the house.

The dining room communicates with the living room by means of a large opening closed by folding doors. The room is rendered octagonal in plan by means of china closets built into each of the corners.

The sun room communicates with both the dining and living rooms.

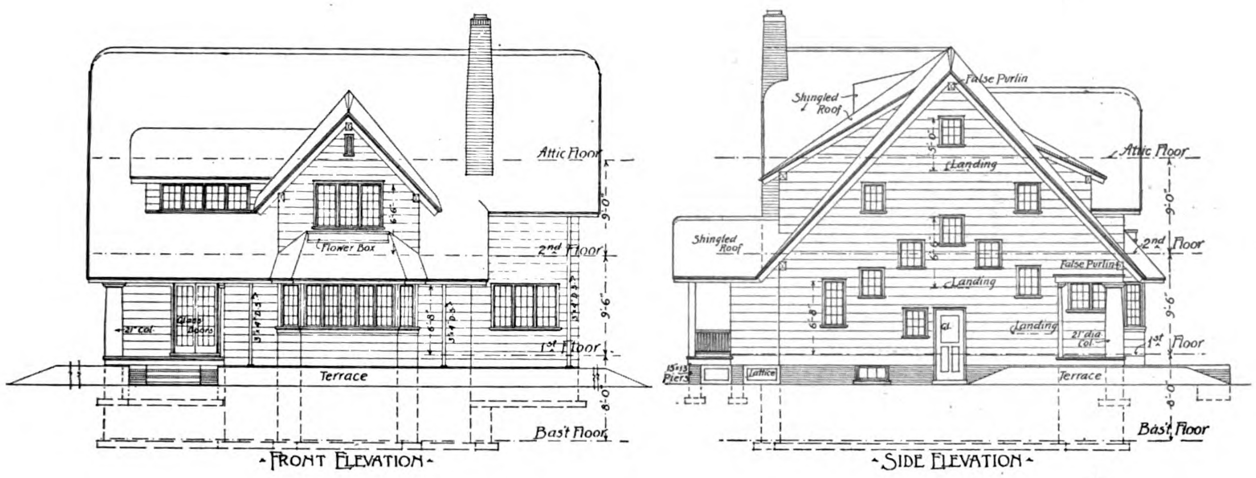
The kitchen is well arranged, the sink being placed directly under a window, with a cupboard handy at the left. The range, placed at the extreme right of the room, next to the chimney, is situated so that adequate light is afforded when cooking.

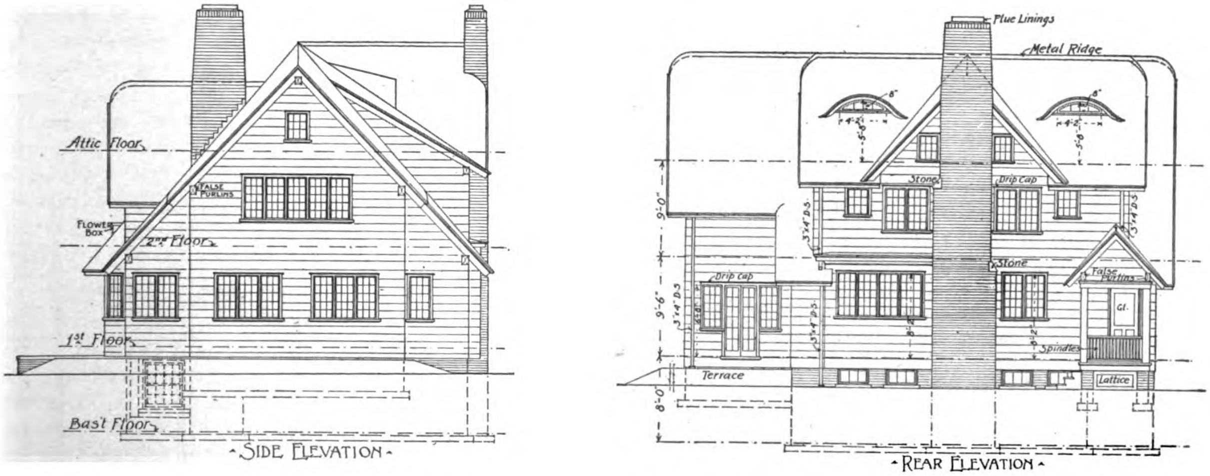
An entry to the kitchen contains the icebox, and opens upon a small porch.

The second floor contains four bedrooms and two bathrooms. An interesting feature of the bedrooms is that plenty of wall space is afforded, which decidedly facilitates the furnishing of the house. The attic contains the maid's room, a bath and a large storage place.

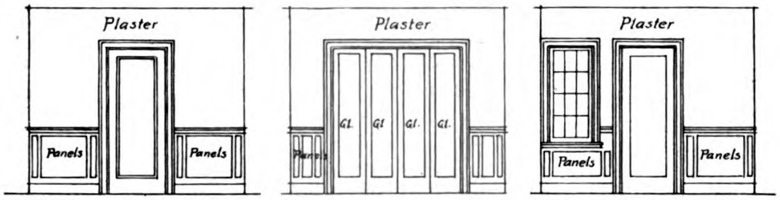
The finish throughout is of oak and gum. Floors are double, the finished floor throughout the first two stories being of oak. The top story finished floor is of pine. Colonial woodwork **was used** in the dining room.

This residence was constructed at Cleveland, Ohio, for H. A. Stahl, in accordance with plans and specifications prepared by the John Henry Newson Company, now known as Robinson Greene, architect, Cleveland, Ohio.

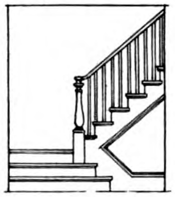




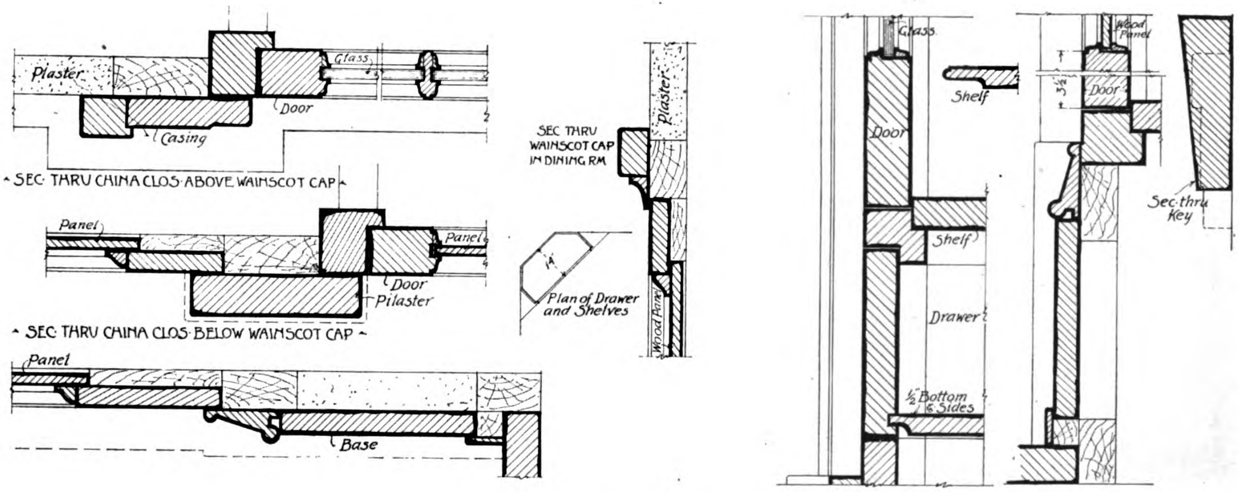
Elevations. Scale, 1/16 *in.* = 1 *ft.*



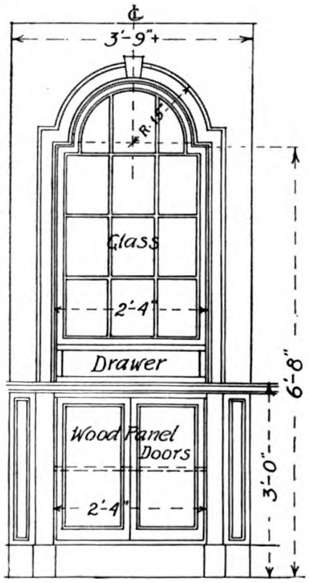
Elevations of Dining Room. Scale, ¼ in. = 1 ft.



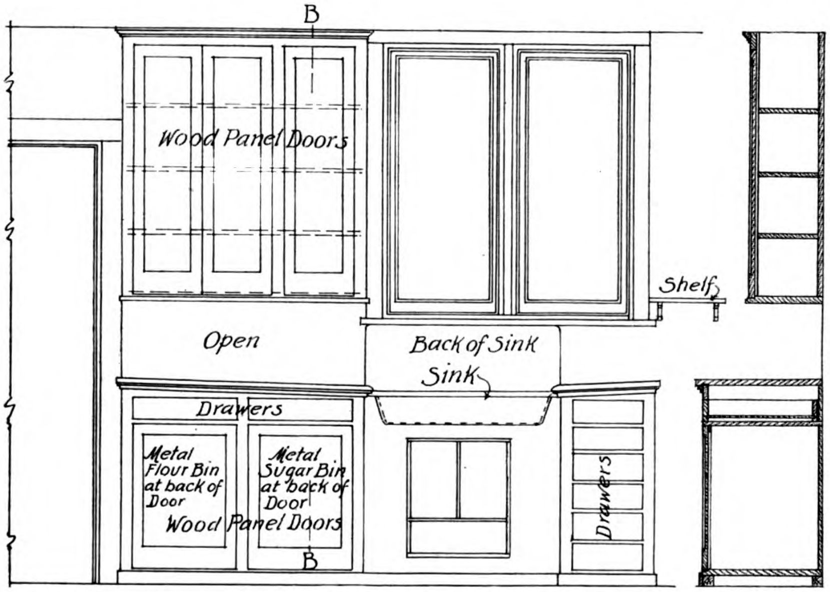
Elevation of Stairs. Scale, ⅛ in. = 1 ft.



3-in. Details of China-closet Shown in Elevation Below at the Left

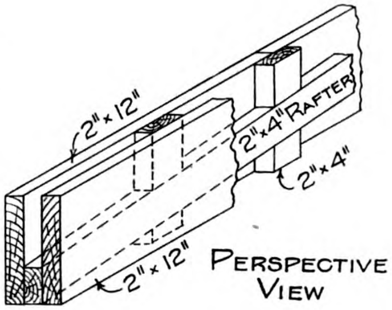


Elevation of China-closet. Scale, ⅜ in. = 1 ft.



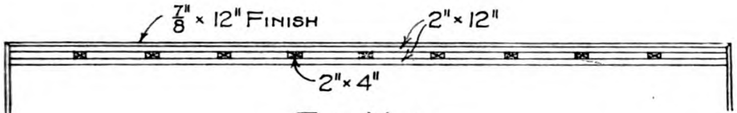
Elevation and Section on B B of Kitchen Cupboard and Sink Scale, ⅜ in. = 1 ft.

Details of a Porch Lintel That Does Not Sag

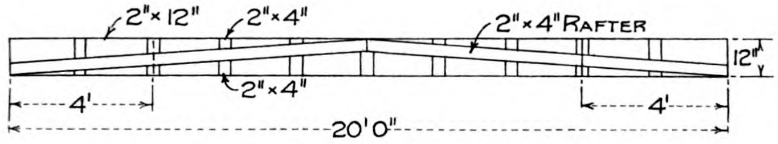


By E. V. Laughlin

PORCH lintels, if of unusual length, are quite apt to sag noticeably unless supported frequently by pillars. At least this has been my experience until I thought out the truss shown in the accompanying figure. I now find it possible to span twenty feet or more without producing as much as one-sixteenth inch of sag. In the figure the length assumed is twenty feet. The same general principles of structure, however, may be employed in lintels that are longer or shorter. In the lintel shown in the figure it is assumed also that planks 16 and 4 feet long are used. In longer or shorter lintels naturally these lengths would be changed to those which would "work" more conveniently.



TOP VIEW



ELEVATION

Construction of the Truss

The truss is built over a falsework or upon the floor and later lifted into position. The 16 foot 2 in. x 12 in. and the 4 foot 2 in. x 12 in. are fitted end to end snugly; 2 in. x 4 in. scantling 10 ft. long are then laid rafter-fashion from the lower corners to the middle of the joined planks, the two being nailed together securely. Short pieces of 2 in. x 4 in. are next fitted snugly above and below the rafters at intervals of two feet. To best prevent sagging these short pieces should stand opposed on opposite sides of the rafters. It is necessary, too, that they make tight joints with the rafters. These short vertical pieces should likewise be securely nailed to the 2 in. x 12 in. bases.

The main part of the truss is completed when the 2 in. x 12 in. planks constituting the other side of the lintel are securely nailed to the rafter and vertical stays. The position of the 16 foot and the 4 foot planks, of course, will be reversed from those first laid down, as this gives a greater measure of strength.

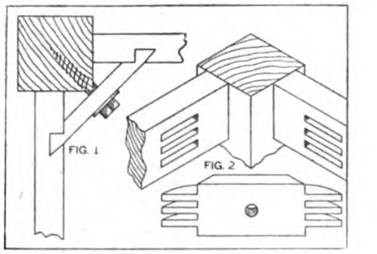
When the lintel is being faced with finish material care should be taken that rather long pieces extend across the union of the 16 foot and 4 foot planks. This tends to relieve the strain that falls unduly at these areas. Naturally, frequent and effective nailing is a very important point in the assembling of any portion of the lintel. Accordingly unusual caution will be taken that the opposing 2 in. x 12 in. planks are tied very securely to the rafters and braces that lie between them. If the end supports are true a lintel truss built as described will carry several tons suspended at the middle without sagging in the smallest measure. And how could it, without breaking the rafters, which are gripped vise-like between the short pieces of 2 in. x 4 in. scantling! Impossible, if well made.

Two Good Methods of Fastening Table Legs to Rail

OCCASIONALLY an inquiry is made concerning the best methods of fastening table legs to the rails, and while the ones shown in accompanying sketches may not be the "best," they have both proved to be good.

In Fig. 1 the fastening necessitates a dovetail cut on each rail, which can be made with a cutter made for the purpose and used on the shaper. The brace itself can be cut out on the saw, run in wide sections against the grain through the sticker, or any way the ingenuity of the operator suggests. In one shop an old tenoner was fitted with knives ground to make this cut to perfection. When these braces are glued in and the bolt tightened up on the leg, it makes a joint that will stand a good deal of hard usage, especially if the brace is made half or two-thirds as wide as the rail.

Fig. 2 shows a fastening that is easier to make and is very effective. The brace can of course be made with as many "fingers" as one's fancy dictates, the more the better, as it naturally increases the gluing surface. The rail has slots cut on the inside to correspond to the divisions on the brace, and they should be deep enough to give the brace a firm hold. Both the slots and the "fingers" on the brace can be made on the shaper, and if a proper form is made there is very little danger in the operation.—*Wood Worker.*



Types of Barn Doors and How to Make Them Weather-Tight

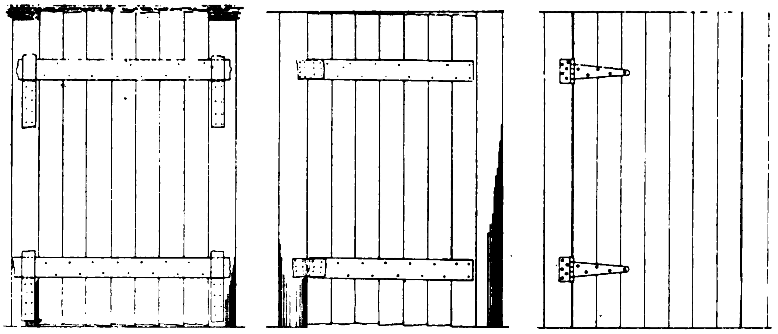
*By E. J. G. Phillips**

THE easy-sliding barn door movable by any child harks back a long way, when measured by results, to the crude closure which required the sturdy muscles of the pioneer to lift it into place, but this is the story of the evolution of the barn door. The achievements in lightening labor have been as pronounced in barn door improvements as in many other more spectacular fields.

The three closely related problems in barn door development have been to mount the door so it is easily operatable regardless of weather or other naturally unfavorable conditions; to build and hang a door which will close the opening as tight as possible, excluding wind and weather; and to build a door which will maintain its shape when built of the ordinary materials at hand and which will itself be tight and stormproof in all seasons. The first is essentially a manufacturer's problem, while the successful solution of the second must be jointly credited to carpenters and manufacturers. The third problem must be left almost entirely to the carpenter for solution.

Barn Door Mountings

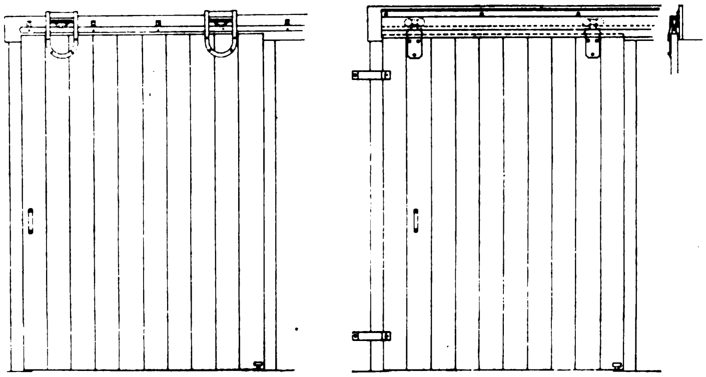
A graphic review of the development of barn door mountings or hanging from the simplest home-made rough-and-ready hingeless door to the most up-to-date sliding door is given in Fig. 1.



A Hingeless Door, Effective but Awkward

Boot-strap Hinge Door, an Improvement, but Ineffective

Metal Hinged Door, a Big Step in Advance



Early Type of Sliding Door, Which Worked Well When It Stayed on the Track

The Last Word in Barn Doors—Stain-proof, Weather-proof, Jump-proof

Fig. 1—The Development of Barn Door Mountings

The hingeless door was effective in closing the opening but difficult to lift to and from its place and almost out of the question for large openings.

The boot strap hinge was an improvement when it did not allow one side of the door to drag on the ground and even then it was superior to the first because it divided the load between the man and the side of the barn.

The advent of metal hinges at a price within the reach of all was a big step in advance, though subject to objections which became more serious with the increasing demand for larger openings.

The sliding door is now the generally accepted door. The earlier productions with hangers rolling on flat steel bar tracks overcame a number of the objections to swinging doors and were good as long as the hangers remained on the track and were not obstructed by birds' nests, snow or ice.

The general lines of improvement advanced by manufacturers of door hardware have been to make the hangers so they cannot jump the track; to make tracks which cannot be obstructed; to prevent rain from beating down between the tracks and the building and running in behind the door, and also to make a track which will prevent snow, sleet or wind from entering the building by blowing in over the top of the door. These efforts have resulted in the perfection of sliding barn door hangers to such a degree that the last word in barn door hangers combines all the desirable qualities.

The group of hangers in Fig. 2 are representative of general practice, having been selected from the catalogs of the Richards-Wilcox Mfg. Co. The development can be easily traced from the older varieties to the most modern.

The hanger shown at "A" known as an anti-friction bearing hanger, was a pioneer in the introduction of this class of barn door mountings. The track and hanger wheels are subject to obstruction by snow and sleet as well as by birds' nests when not in constant use.

A hanger introducing the roller bearing is shown at "B." This hanger, as well as the former, is subject to track jumping unless exceptional care is used in hanging the door so the top will be very close to the bottom of the track. An improvement correcting this defect is shown at "C."

A radical departure from the first designs embodying the jump-proof, bird-proof, snow-proof, unobstructable track features is illustrated at "D." The hanger wheels and bearings are completely enclosed by the trolley track which, because its only opening is a narrow slot in the bottom, is unobstructable.

This type has been given many improvements, such as flexible connections to the doors, the application of various kinds of roller and ball bearings, and

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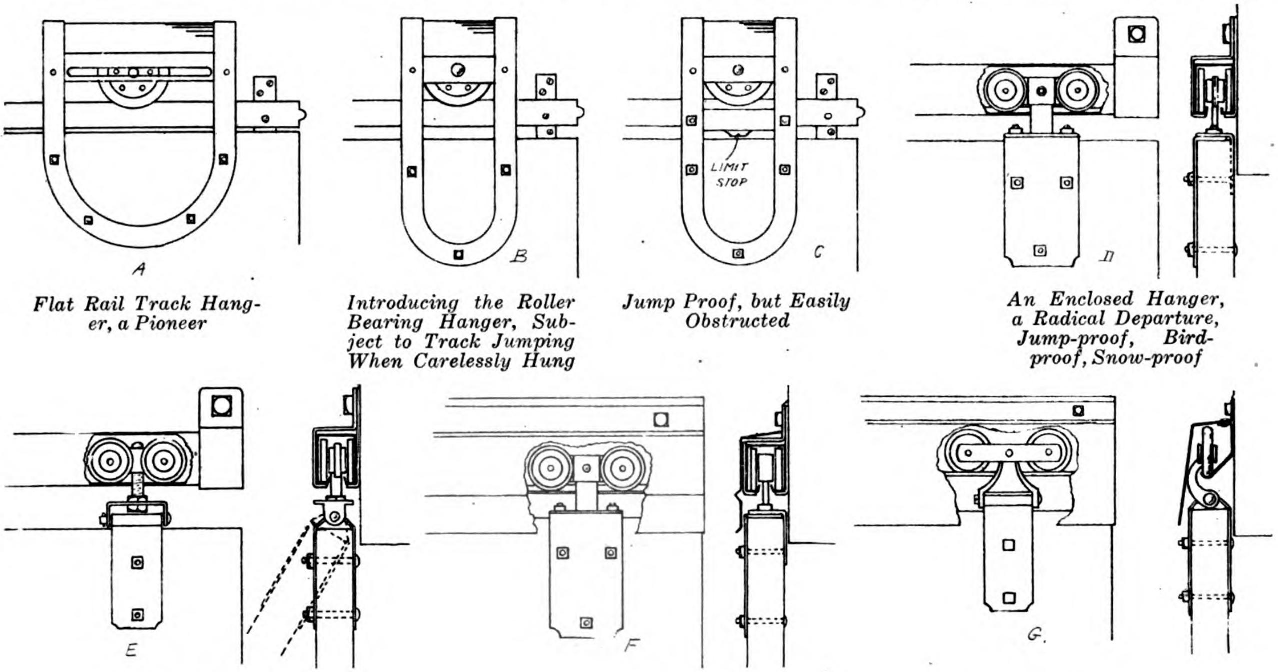
*Chief Engineer, Richards-Wilcox Mfg. Co.

the addition of vertical and lateral adjustments. An example of a hanger with all adjustments, etc., is given at "E." Hangers with tracks which are completely enclosed and entirely stormproofed are shown at "F" and "G."



Flat Rail Track Hanger, a Pioneer

Introducing the Roller Bearing Hanger, Subject to Track Jumping When Carelessly Hung

Jump Proof, but Easily Obstructed

An Enclosed Hanger, a Radical Departure, Jump-proof, Bird-proof, Snow-proof

This Can Be Adjusted Both Vertically and Laterally and Has a Swing-out Feature

Types Which Are Completely Storm-proofed and Protected

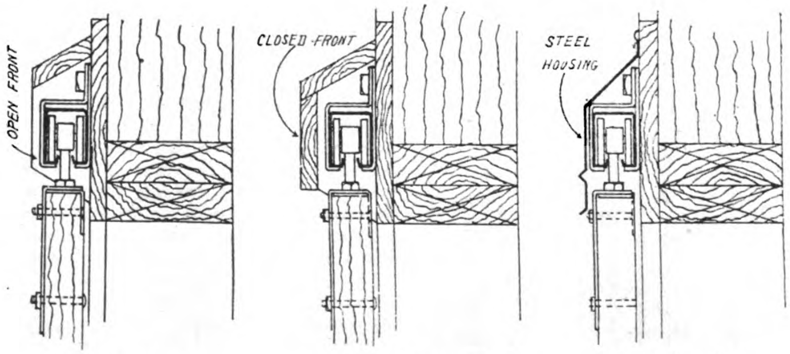
Fig. 2—Showing the Development of Sliding Barn Door Hangers

Stormproofing the Doorway

It has been customary to cover this trolley track with a wood or metal housing, as shown in Fig. 3, to prevent rain from running down between the track and the lintel of the doorway into the building. The form at the left has an open front, while the design at the center is closed and is undoubtedly more effective. The former permits snow to blow in and lodge on top of the track and also permits particles of hay, straw, leaves or other moisture-retaining debris to collect. This moisture on top of the track tends to hasten corrosion of the track and rotting or decay of the building itself. The second type of cover overcomes this to a considerable extent. It is, however, exceedingly difficult to fit this cover tight to the building and to maintain its tightness.

Recently the steel stormproof housings illustrated at the right in Fig. 3 have been used to a considerable extent. These may be used along the entire length of the track or only over the doorway. By noticing the construction at the top where the shield joins the building it will be evident that a fairly tight joint can be maintained. The lower part of the shield extends down below the top of the door and effectively closes this space, preventing the weather from beating in over the top of the door. This feature also protects the top of the door to a considerable extent by keeping out the moisture and thus retarding decay. The storm shield feature has also been incorporated as a part of the completely protected and stormproof door hanger tracks, examples of which are shown in Fig. 2 at "F" and "G."

The ordinary method of building up the doorway and hanging the door is generally acceptable, but during the last two or three years a strong movement has developed, particularly in the northern States, in favor of close-fitting, wind-defying and entirely stormproof barn doors.



Open Front

Closed Front, Wood Housing

Metal Housing

Fig. 3—Door Track Housings

The details in Fig. 4 show how a sliding barn door may be hung so it will close the opening very tightly and yet have plenty of clearance while opening. A 2 x 6-in. piece is attached to the side of the building and the track is secured to this. A strip attached to the top of the door extends under the 2 x 6 and up close to the side of the building. A 2 x 10 is used for the back jamb and a 2 x 12 serves for the jamb at the side of the opening toward which the door closes, as in the plan Fig. 4. Lap strips "X" and "Y" close the vertical sides of the doorway very tightly. It is necessary to secure these strips very firmly to the door to prevent them from being knocked off.

The arrows indicating the path of possible wind currents cannot fail to impress the observer with the value of this rather extraordinary construction.

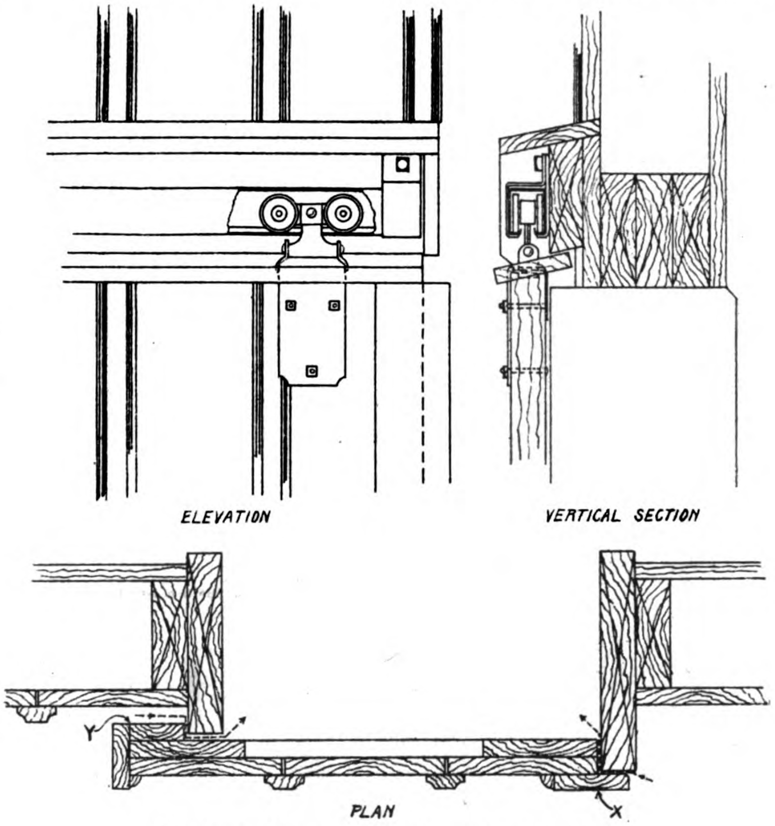


Fig. 4—An Unusually Tight Fitting Barn Door

Double sets of doors, one inside and one outside, are often used during the winter seasons. This, however, requires the opening of two doors every time and it is frequently difficult to find a place in which to slide the inside door. This leads to various makeshifts, cumbersome and unsatisfactory, such as hinging the doors at the top of the opening and raising the lower end with a block and tackle or perhaps engaging the services of two men to raise the door and then hook it in position. Many times a more carefully constructed doorway would make the extra set of doors unnecessary.

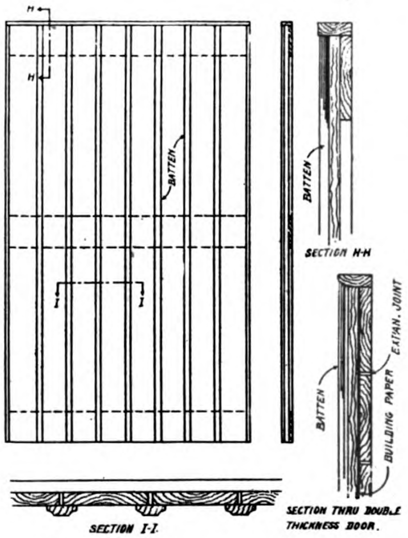


Fig. 6—A Barn Door of Improved Construction

Building the Door

A few suggestions in regard to the construction of the door may be well worth considering. The most common barn door consists of a frame of ⅞-in. x 6-in. boards covered with matched sheathing as Fig. 5. This door when built of ordinary commercial lumber, as is usually the case, is very likely to warp when subjected to varying weather conditions. If the door is small, it may answer fairly well, but with increasing size the difficulties increase correspondingly.

The battened door, Fig. 6, is a considerable improvement, inasmuch as provision is made for the shrinking and swelling of the lumber. Instead of using matched lumber, plain ⅞-in. x 6-in. boards are used to cover the frame, allowing a space of ¼ in. between the boards. The expansion joints are covered with battens. Ship lap lumber may be used if preferred, making a similar allowance. It is well known that shrinkage or swelling of lumber affects mainly the width of a board and the length remains practically constant or, in other words, lumber shrinks very little in a direction parallel with the grain of the wood. Fig. 7 is an exaggeration showing the effect of swelling or increasing the width of the boards in a barn door when correctly and also when incorrectly constructed.

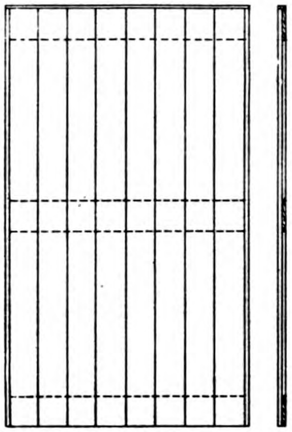


Fig. 5—A Common Type of Barn Door

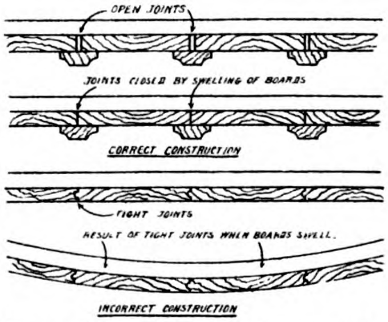


Fig. 7—Sketch Showing Exaggerated Effect of Swelling in Barn Doors

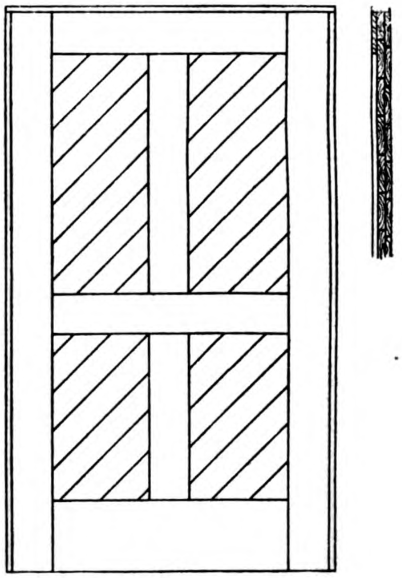


Fig. 8—A Barn Door of Good Appearance

The door in Fig. 6 is not only the best type of single thickness door, but it also

matches the battened barn better than any other.

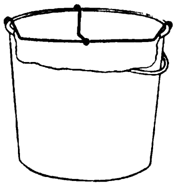
A double-thickness door of the type just described is admirable for colder climates. The inside thickness is laid horizontal or at right angles to outer layer, and a lining of heavy building paper is built in between the two thicknesses of wood, as detailed in the lower right-hand corner of Fig. 6. The same space should be allowed between the boards laid horizontal, but the expansion joints on the inside need not be covered with battens.

A door more nearly approaching the mill-made door in appearance is shown in Fig. 8, which consists of two thicknesses of matched ceiling laid diagonally in opposite directions with a sheet of heavy waterproof building paper between. The framework of ⅞-in. material sets it off into panels and makes the total thickness of the door about 2⅛ in. Care must be used not to crowd the boards too close together. A slightly open joint detracts but little from the appearance of a barn door, but it means a world of difference in damp weather when the boards swell. While, of course, considerably more material is required to build double-thickness doors, yet they overcome to a considerable extent the trouble caused by warping. Inclination of one side to warp will be largely overcome by the other side.

A good protective coat of paint on both sides of the door will assist in preventing the absorption of moisture. This should be frequently renewed to keep the door in a moisture-resisting condition. The lumber used in double-thickness doors should be painted on both sides before the door is built up.

A warped barn door certainly cannot be made to close an opening tightly, and a door which does not fit tight must of necessity tend toward making a cold building. Therefore, in such parts of the country which are subject to severe winter weather, every effort should be made to build doors which will maintain their shape. A door which rubs and scrapes on the side of the building, even though mounted with the very best door hangers, is just as much of a nuisance as the best-constructed door mounted in such a way as to make its operation uncertain and difficult.

How a Painter Avoids Spatter Marks



LAST fall I painted a bungalow and when I finished, both the owner and his wife complimented me on the cleanliness of my work and the absence of spatter marks. I used the little device shown here, which is simple and my own idea, to wipe the brush after dipping into the pot. It permits you to work without getting any paint whatever on the outside of the bucket and consequently there is no dripping to smear up the floors and window sills, likewise there is no waste. As you may see by the sketch, this wiper consists merely of a piece of fairly light wire which can readily be bent with the hands. It is formed into the shape indicated and then slipped down inside of the paint bucket so that the hooks on each end and the one in the middle slip over the edge of the pot and hold wire steadily across the middle so that it will not move when wiping the brush against it. —*Carter Times.*

Some Simple Tests for Painting Material

Present Uncertainty in Securing Good Materials Will Render These Tests Valuable

THERE is no line of business with which the writer is familiar in which the materials used vary so much. The goods made by one manufacturer will frequently be worth more than the same materials turned out by another manufacturer. Not only this, the goods made by the same manufacturer will sometimes vary considerably with the various batches turned out.

Necessity for Simple Tests

When we remember this we can readily understand the desirability—yea, the absolute necessity—of the painter having some simple tests by which he can get at least an idea of the true quality of the material he is about to use. If he opens a barrel of linseed oil he ought to be able to know that the package contains just what it says it does, and nothing else. But someone will say: "I buy linseed oil in barrels with the crusher's name and guarantee on it; hence I know I am getting pure oil." We all know the legitimate crusher's name and guarantee are all right, and if the oil gets into the painter's hands without the bung being removed, after the crusher puts it there, then there is neither question nor trouble. This does not always happen, however, for it has not been many months since a broker or jobber in Chicago had to admit, under oath, that he drew 2½ gal. of raw oil from each barrel and poured in 2½ gal. of "dope," chiefly benzine, and simply changed the stencil to read "Boiled Linseed Oil" instead of "Raw Linseed Oil," leaving the manufacturer's name and guarantee intact.

The painter who bought five barrels of this oil accepted it in good faith, because of the manufacturer's name and guarantee, and spoiled a lot of work, which had to be done over again. If he had not put too much dependence in the statement on the barrels, he would have saved himself a lot of trouble and expense, as well as an injury to his reputation.

The equipment required for testing most of the staple materials used by the painter is neither great nor very expensive. Indeed, the expense is so little that we often wonder why every shop does not own an outfit.

It is not the writer's intention to give directions for testing all the various materials the painter uses, for this would encroach too much upon the time of this convention. We must, therefore, content ourselves with the consideration of a few of the staples.

White Lead

This old, reliable painters' material is easy to test, provided it is strictly pure carbonate, but if it should happen to be sulphate or a composite base the task is more difficult. The eye will usually be all that is needed to determine whether the lead is white enough. For fineness we may put a very little of the

paste on the nail of the thumb of one hand and spread it with the forefinger of the other hand. It will be very easy to see whether the lead is fine or coarse. We will now light our little alcohol lamp, which is similar to that used by jewelers, and, after scooping out a small place in a piece of charcoal and filling it with the white lead, we take a small blowpipe and direct the flame from our alcohol lamp upon the spot of white lead. If it is pure carbonate, it will soon be reduced to metallic blue lead, forming in the shape of small shotlike particles. If it is sulphate, instead of carbonate, or if it is a combination lead, it cannot be reduced to blue lead without the addition of a flux. If no blowpipe and charcoal are at hand, a match may be inserted in the white lead, being sure that plenty of lead adheres to the match, and, holding this match in one hand, burn other matches under it, allowing the flame to play on the white lead. This heat will soon reduce the white lead to metallic blue lead, if the sample is carbonate. If it is found that the material is not carbonate, etc., and a qualitative analysis is desired, we would advise the painter to consult a chemist.

To determine whether keg lead contains an excess of moisture or not, stick a piece of sheet gelatine down in the lead and let it remain there all day or all night. When removed, if the gelatine is soft, the lead is "long" on water; if the gelatine remains stiff and springy, there is no excess of moisture present. This is a good test to determine whether the lead is dry-ground or pulp-ground. Dry-ground lead will not soften the gelatine.

To test the capacity (or covering power) of white lead, weigh exactly four ounces of the lead in a cup. Now add two ounces more, by weight, of linseed oil, mix thoroughly and apply a coat to an ordinary school slate and note which of the samples covers the dark surface best.

Red lead may be tested the same as white lead. If either is in a dry state, rub to a paste on a piece of glass, using an elastic spatula for rubbing up.

Linseed Oil

In these days of high prices the market is flooded with linseed oil substitutes and imitation oils. Since linseed oil is the very life-blood of paint, it is imperative that its purity should be above question. Since we know of no simple tests that can be absolutely relied upon, and since it costs so little to have a chemist tell us the real facts in regard to our oil, it would seem that if there is even a suspicion that our oil is not pure it would be worth while to send a sample to a chemist occasionally in order that we may be sure of our ground. The editor of the *Decorator* will, with pleasure, recommend suitable paint elements if requested. The fee for testing the purity of linseed oil would be about 10/6. Of course, if a complete analysis, showing percentages of all ingredients, were desired, this would cost more, but would hardly be necessary except in case of a dispute.

Take a few drops of oil in the palm of the hand; rub the hands together briskly until quite warm. Smell the palms quickly before they have a chance to cool. If the oil is adulterated with rosin oil, fish oil or petroleum (the usual adulterants), the sense of smell will usually establish the fact. If the oil is raw, take half a teaspoonful in the mouth and taste it. If it is pure, the oil will have a pleasant, slightly bitter, nutty, seedy taste, but if it contains any of the usual adulterants and the sense of taste is normal their presence will be made manifest. Because of the drying salts that are invariably added to boiled oil this always has a very bitter taste.

The color and body of linseed oil enable one to tell whether a sample is raw or boiled. Raw oil is thinner, much lighter in color, and has a golden amber tinge. Most boiled oil is quite dark, and of a distinctly reddish color.

William E. Wall of Somerville, Mass., the well known and greatly loved artist-grainer, tells us that he places great reliance upon the "bottle test" for linseed oil. He takes a clean, flat bottle, holding half a pint, and fills it with oil. He then inverts the bottle and allows the oil to run out quickly. The bubbles formed above the oil and left in the bottle will all be five-sided if the sample is pure linseed oil; but if it contains 3 per cent of petroleum or hydrocarbon oil there will hardly even be any bubbles formed, and if they do form they will not be five-sided.

Japan

There are few materials used by the painter that cause so much trouble as japan. A little poor japan will often spoil a lot of good paint and put the painter up against a bunch of trouble.

A favorite method of testing with the writer is as follows: We secure a clear, round bottle, holding not less than four ounces. On this bottle we paste a piece of white paper, starting the paper even with the inside of the bottom. On this piece of paper we make a gage to indicate twelve parts of raw linseed oil and one part of the japan to be tested. We first pour in our oil, getting exactly the quantity required, then add our japan. We shake the bottle, noting whether the japan curdles or not. With a small brush we apply a coat of this mixture We note how long it takes to dry, and also the toughness, brilliancy and smoothness of the film formed. We determine the toughness by running our penknife blade through the film, cutting it off in long ribbons, if the film is tough.

We also mix a little white lead paint with our mixture of oil and japan, noting whether it curdles or livers the paint, and also how it dries. When the paint is thoroughly dry on the glass to which we applied it, we test the toughness of the film as above. Test several japans in competition, and it will be easy to determine which is best, cheapest and most economical to use.

Tinting Colors

In testing tinting colors, we need a pair of small apothecaries' scales, suitable weights, a spatula, a light of glass suitable in size, some zinc oxide or white lead in oil, and a bottle filled with half-raw oil, one-fourth good japan and one-fourth turpentine.

Suppose we wish to test a number of samples of Prussian blue, yellow ochre, chrome green or any other tinting color, to determine which is best and cheapest for the price. We weigh exactly an ounce of the white base we are using. Without removing the white from the scales, we put a half-scruple weight on top of the ounce weight and put tinting color on the white until the scales balance perfectly. This gives us one part of color to forty-eight parts of white. We now remove all the paint from the scales and deposit it on the glass. With our spatula we mix the paint, reducing it somewhat with the liquid we mixed in our bottle. Now we take a clean brush, and, after adding a little mixing liquid from our bottle, we stir and work the mixture on the glass, adding the mixing liquid as needed until the paint is of a brush consistency. We now paint a small space on a piece of glass, using gummed labels to identify the samples. It is best to number all the samples to be tested and identify the painted samples by the same number. When dry, the depth and clearness of the tint produced and the prices of the tinting colors will guide in deciding which sample is best for the price asked for it.

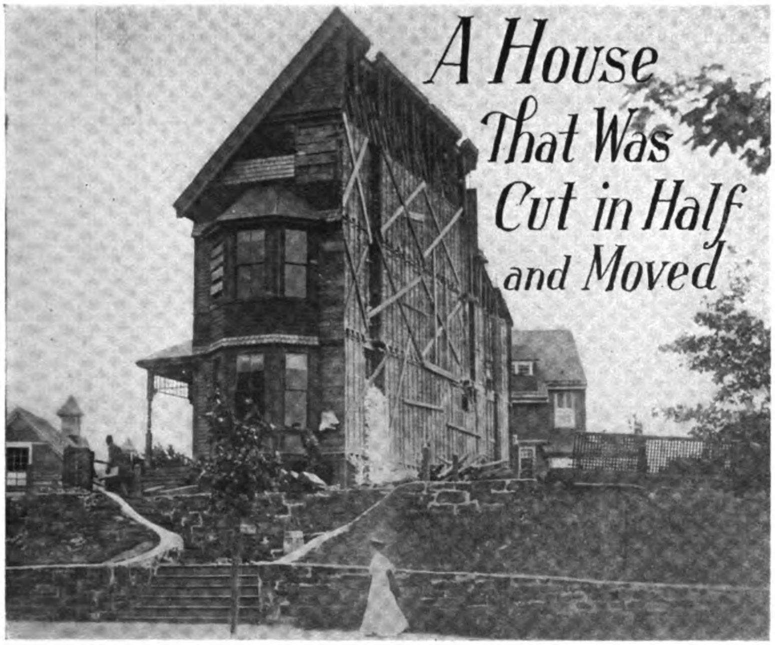
Varnishes

Only "Father Time" can determine to a certainty whether a varnish will be durable or not, but there are many things about a varnish that a painter can and should know in advance, such as its working and drying properties, its brilliancy and the toughness of the film formed. To test a varnish we will need only a light of glass, some gummed labels and a clean cup and brush for each sample. After numbering our samples, we flow a coat of each on a separate space of our glass, marking the space to correspond with the sample. We make a note of the working properties, drying, etc. When dry, we test the films for toughness, using a penknife as stated above. Everything else being equal, the tougher and more elastic the film formed the more durable the varnish will be.

Dry Colors

In testing dry colors we simply rub them up to a thin paste on a light of glass, using either water to which a little gum arabic has been added or the mixture of oil, japan and turpentine used in making the tests of colors in oil. All color samples should be painted on glass and be observed through the glass when determining their relative strength and richness. Their fineness may be determined at the time of mixing, or may be judged from the painted side of the surface to which the colors are applied.—The *Decorator*.

A House That Was Cut in Half and Moved



By Robert H. Moulton

ONE of the most singular ideas ever involved in the moving of houses was recently put into practice in West Somerville, Mass., where a large three-story dwelling was cut in two and moved from an eminence 10 ft. above the street level and set up a mile distant from its former resting place. It was found impossible to move the house in its entirety. The cut was made squarely through the center, and as the house was built in a very symmetrical manner, each part was an exact counterpart of the other.

After bracing the house, first one section and then another was moved to the new location with jackscrews and rollers. On bringing the two reunited divorced portions together they dove-tailed into such a perfect fit that it was impossible to discern the separating cut. As each of the sections was 35 by 20 ft. at the base and almost 40 ft. in height, they were liable to topple over during the process of moving. This was prevented by tearing down the chimneys and foundations and loading the first floor of each section to a considerable depth with brick. The brick acted as a ballast and the sections were moved without any damage to the structure.

Using the Steel Square in Roof Framing

By George L. McMurphy

PROBABLY no other subject in relation to the erection of buildings has been more written about and had so many special tools, charts and tables constructed to aid (?) in its application than roof-framing. And no doubt every roof framer has his special method of solving the problems that are constantly met with in this branch of construction, and equally sure it is that every one of them thinks his "ugly duckling" is the only swan in the brood. Because I'm like all the rest and think that, while my own "ugly duckling" may not be the only swan in the brood, it has a peculiarly sweet song all its own, I venture to offer some suggestions on this much-discussed subject in addition to those which already have been published.

I think the method I use is somewhat different from any that I have seen presented by others, and I think it is plainer to describe, uses less confusing lines (to the inexperienced workman), and is therefore easier to understand, while it possesses the additional advantage of being applicable to almost any kind of roof.

It will be noted that I have made very sparing use of dimension figures, my object being to illustrate how the various lengths and bevels can be obtained without extended mathematical computations and a knowledge of that branch of science not possessed by the majority of journeymen carpenters (and most foremen), as I have found them in an experience of forty-five years. For similar reasons I have mainly used roofs of unequal pitches, because the methods described will apply as well to roofs of equal pitches. The pitch used is mainly "one-third pitch," or 8-in. rise per foot run—probably the most commonly used. I have also taken the plate lines, paying no attention to the cornice problem, though that also has sometimes to be considered.

The ground plan is substantially the same as that used by "W. G. S. B." in the issue of December, 1914, which I recently came across while looking over my files for another purpose. While this is not intended as an answer to him, it will nevertheless show another way than the one he uses and which he said was the only one of which he knew.

Also, I have paid no attention to finding the plumb and level cuts for either common, cripple (or jack), hip or valley rafters, because practically every carpenter knows that the rise and run of the common rafter on the square will give both those cuts for common rafters, and that the rise of the common rafter and the seat of the hip or valley will give the plumb and level cuts for those rafters. The seat of the valley can be found from the scale, and the plumb and level cuts for cripples are the same as for the corresponding common rafters.

In the accompanying illustrations Fig. 1 is the ground plan showing the seats of the ridges and valleys, Fig. 2 is an elevation of the roof of the end *B*, and Fig. 3 the elevation of the side *A*. The elevations are not necessary in framing the roof, but are used here to help in understanding the method.

All the roofs have the same pitch except that part covering a, c, d, Fig. 1. The ridges a and b being the same height (see elevation), the gable at B being 17 ft. while that at D is 20 ft., the roof covering a, c, d will have a different pitch from the others.

The roofs meeting at the ridges over the seats B and C, Fig. 1, having the same pitch, the seats of the valleys f, i and g, h will be at an angle of 45 degrees with the plates and 3, i and 3, f will be equal, also h, l and g, l. The ridges over the seats A and B being of the same height, the ridge over A will meet the main roof the same distance from e that ridge B does from l (in this case 10 ft.). Having then made e, c equal to l, g, a line drawn from a through c meeting the ridge seat C at b will be the seat of the long valley and d, c will be the seat of the short valley (shown as a', b' and d', c', Fig. 4, respectively. The lengths of these valleys can be found from the roof plan, Fig. 4, which is a plan of the rafters, both common and cripple, and the valleys of that part of the roof covering 4, a, c, d, 1, 2, 3, Fig. 1, and in which $1'$, $2'$ and $3'$, $4'$ are made equal to the length of the common rafters, and $1'$, $4'$ and $3'$, $2'$ the same as 1, 4 and 3, 2, Fig. 1, $3'$ b' being equal to 3, b, Fig. 1, a', b' gives the length of the long valley, and, the point c' being found by making $3'$, x equal to 4, e (or f, l), Fig. 1, drawing e', x parallel to $4'$, $3'$, when the intersection of e', x and a', b' at c' will be the intersection of the two valleys. The lines 6, 7, 8, 9, etc., give the lengths and the cross bevel for the cripples. Fig. 5 is the corresponding framing plan for the roof, covering a, c, e, Fig. 1, a', e' being the common rafter, a', c' the valley, and the lines 2, 3, 4, etc., being the cripples, e', c' being made equal to e, c, Fig. 1, e', a', c' will give the cross bevel for the cripples. It will be necessary in cases of this kind to "back" the valley a', b', Fig. 4, from c' to b', and the valley f', i', Fig. 1 (seat only is shown), from g' to i' on one side of the center.

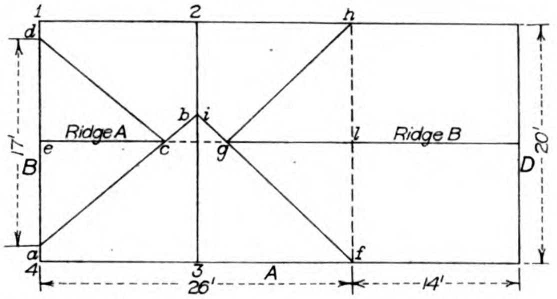


Fig. 1—Plan Showing Seats of Valleys and Ridges

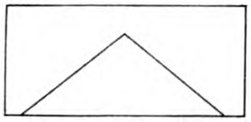


Fig. 2—Elevation of End B of Fig. 1

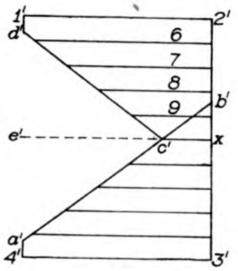


Fig. 4 Shows the Rafter Lengths

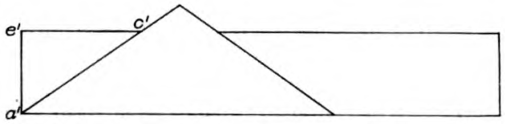


Fig. 3—Elevation of Side A at Fig. 1

The chief advantage of this method is that the lengths of all valleys and cripples and the cross bevels for the cripples are all found on one plan without any confusing lines, and it can all be drawn to scale with the use of only the steel square and pocket knife (or sharp pencil, though I would recommend the knife), and does not require any arithmetical computation or a knowledge of square root. Of course, I do not decry the advantages of education. The young carpenter should acquire all his opportunities will permit. But I am writing for the benefit of the inexperienced workman who may not be well up in arithmetic or geometry.

There is a rule used by some for obtaining the cross bevels of cripples—"the length of the common rafter on the blade of the square, the seat of the same rafter on the tongue, cut by the blade." The rule is good for roofs of equal pitches, but is better stated "the length of the common rafter on the blade, half the width of the building on the tongue, cut by the blade."

Figs. 6, 7, and 8 show why it can be more easily understood and therefore more generally applied stated this way. Fig. 6 is the plan of a building 18 x 24, to have a hip roof, and shows the seats of the hips and common rafters meeting at the center. Figs. 7 and 8 are roof plans showing the common, cripple, and hip rafters for one quarter of the plan, a, b, c, d. Being drawn on the same principle as Figs. 4 and 5, they are self-explanatory, and it will be seen that in each case the common rafters a', b' and c', b', with the corresponding halves of the widths of the building, a', d' and c', d', give the bevels for the cripples. A com-

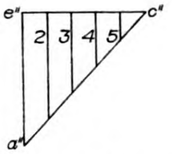


Fig. 5—Roof Framing Plan Covering a.c.e. of Fig. 1

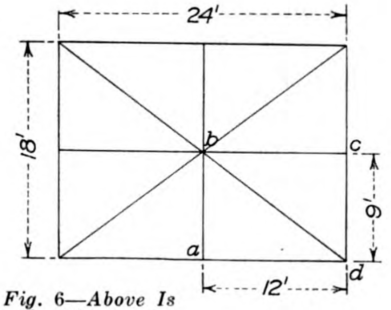


Fig. 6—Above Is the Plan of a Roof Showing Hips and Common Rafters Meeting at the Center

Fig. 8 Is Roof Plan for One Quarter of Fig. 6

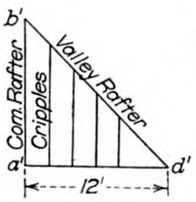


Fig. 7—At the Left Is Roof Plan for Part of Fig. 6

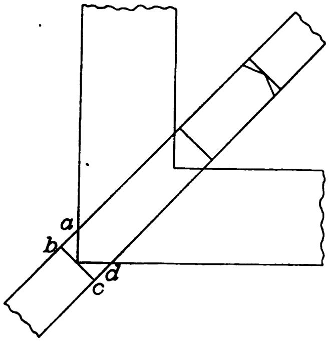


Fig. A Is Plan of Plates at Corner of Building Showing Seat of Hips

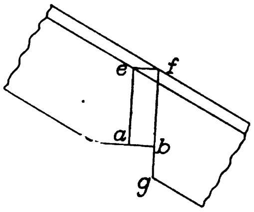


Fig. B Shows Elevation of Hip

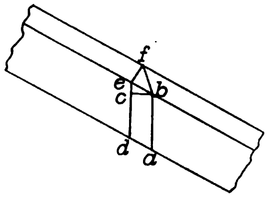


Fig. C Shows a Method of Obtaining Cross Bevels for Cripple Rafters

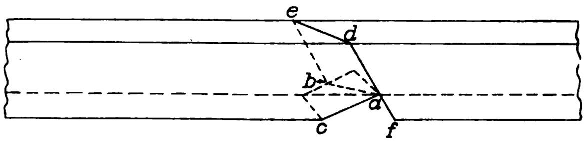


Fig. D Illustrates a Method of Obtaining Bevels for Hips or Valley Against Ridges or Each Other

parison with Figs. 4 and 5 will show the variation of the rule for valleys where the roofs are of uneven pitches. Of course, where the roofs are of the same pitch the rule will be the same for both hips and valleys. With the rule stated the other way, it is necessary first to understand that the seat of the rafter is really half the width of the building before the rule is fully comprehended.

Figs. A and B show an easily understood way for finding the proper backing for hips where for any reason it may be necessary to back them, or for valleys, as in the case of part of the valleys in Figs. 1 and 4. Fig. A is the plan of the plates at the corner of a building, showing the seat of the hip (like the others, it shows the hip for roofs of unequal pitches), and Fig. B is the elevation of the hip showing the bottom cut, g, f being the plumb line. Make a, b equal to a, b, Fig. A, and from a draw another plumb line, a, e. Square across from f to e (or f, e can be drawn square with g, f and made equal to a, b, Fig. A). Then the line drawn through e parallel with the top edge of the rafter will be the gauge line for backing, working, of course, to the center of the rafter. Proceed the same way with the other side of the rafter, using c, d instead of a, b. The section shows a slight difference in the amount of backing on the two sides, but in ordinary cases the difference will be too slight to be worth taking into account. Where the roofs are of the same pitch and the rafter sits at an angle of 45 deg. the backing will, of course, be the same on both sides.

Fig. C shows another way to obtain the cross bevels for cripple rafters. Square over from the plumb line a, b, making b, c equal to the thickness of the rafter. Through c draw d, e parallel with a, b, and from e square across the top of the rafter to f, and f, b will be the bevel desired. Note that the thickness of the rafter must be measured square with the plumb line, not up or down the rafter as one writer has directed.

Fig. D shows a method of obtaining the bevels for hips or valleys against ridges or each other that will apply to almost any kind of roof, square, octagon, hexagon, equal or unequal pitches, etc. Make the bottom cut c, a, f, as shown (or make a level cut, c, a, on a piece of the same material). Find the bevel the seat of the rafter makes with the seat of the ridge (as at a, b, 3, Fig. 1) and mark it across the level cut, as a, b. From b draw a plumb line, b, e. Connect e, d across the top of the rafter, and it will give the bevel desired.

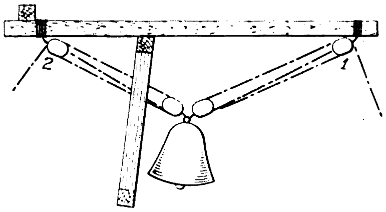
Note that the valley over g, h, Fig. 1, will be cut square across to meet f, i at g, while the valley over a, b (shown at a', b', Fig. 4) will not be cut square at c'.

It will be seen that this method, while sufficiently accurate for any ordinary jobs, does not require one to memorize a set of tables, which are most likely to be forgotten just when needed, nor does it require the possession of any special tool or chart, which is most likely to be "in my other coat" when wanted, but all the lines and bevels can be worked out by the square and pocket knife and a smooth board (I have used a wide shingle when nothing better was at hand).

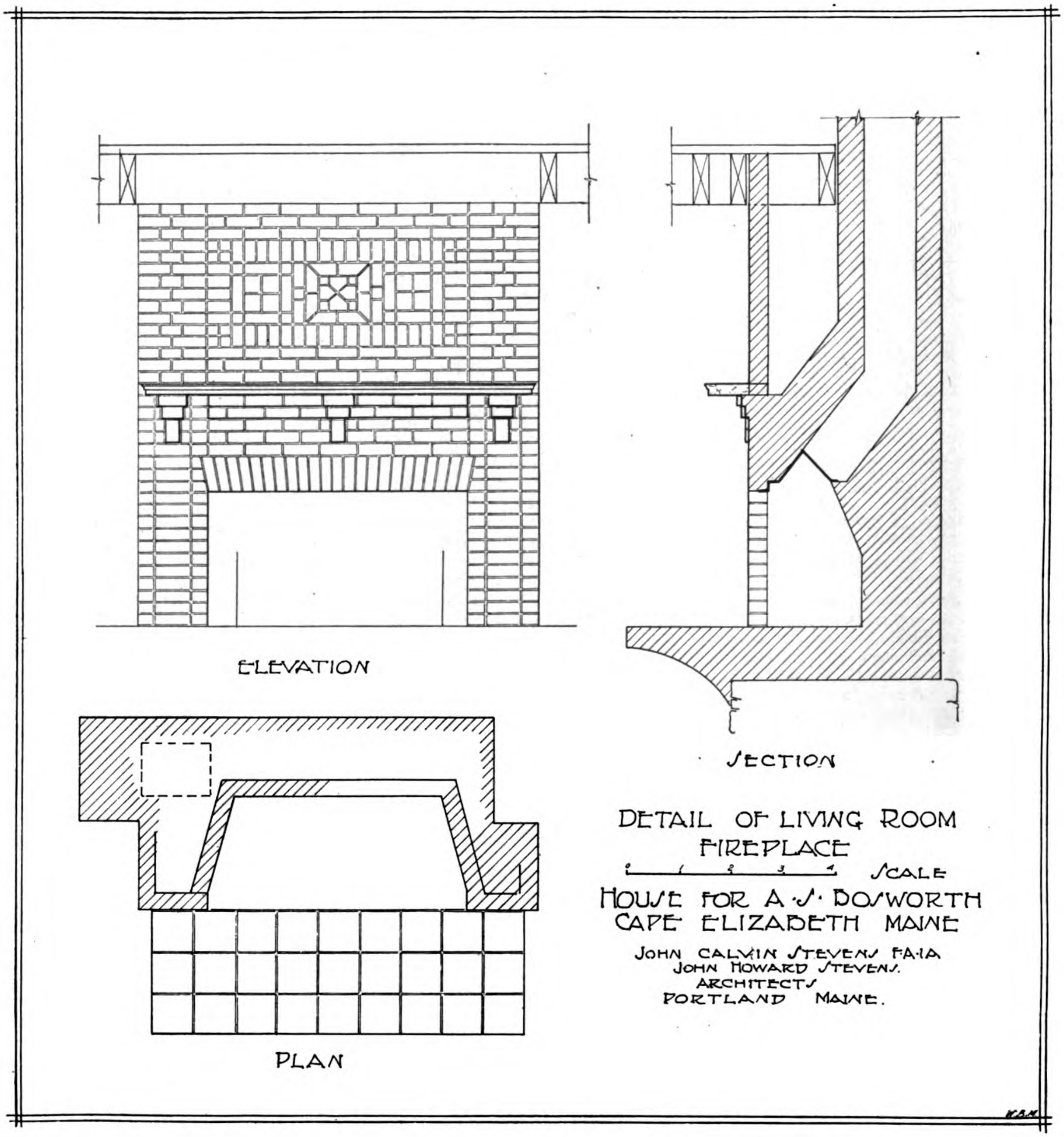
A Practical Kink in Bell Hanging

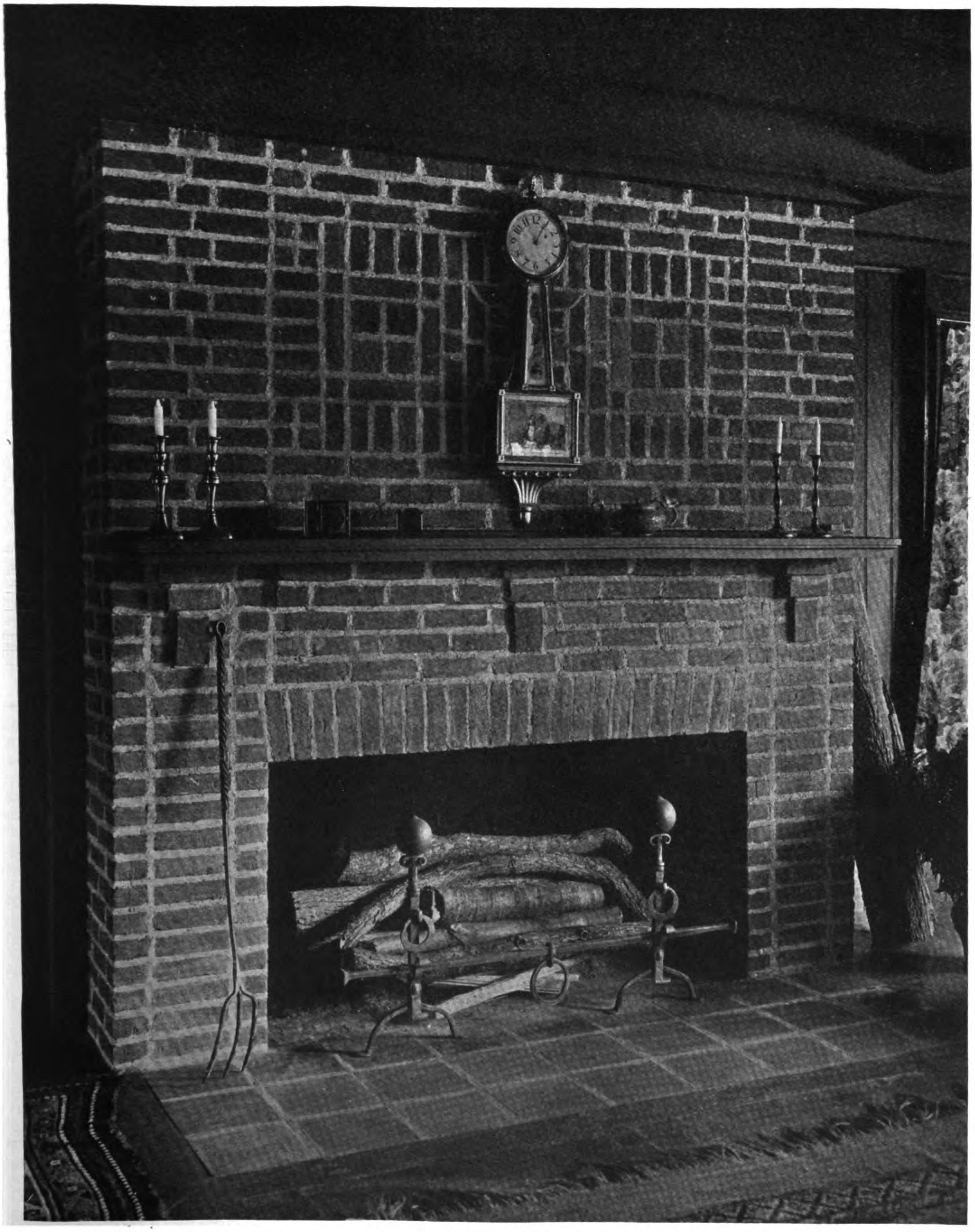
By H. P. Ryan

THINKING that perhaps the following would help some brother chip, I am sending you a sketch showing how I put a bell in a church tower, or rather, how I took one out and put another one in. First I removed the front of the steeple so as to give me plenty of working space and then rigged up a gin pole with two sets of blocks, one directly over the old bell and one on the extreme end, so that the bell would swing clear off the gable end. I then picked up the bell with blocks No. 2 so that it just cleared the belfry floor. Then I hooked on No. 1 and pulled the bell as high as I could. Then I would lower with No. 2 until the bell was as low as it would go and raised again with No. 1. After a few operations like this the bell was at the outer end of the gin pole and was lowered to the ground. The new bell was put in in the same way. This avoided a lot of staging that is sometimes used for a job of this kind.



Details of a Brick Fireplace





Legal Department

When Work Is Accepted Is Waiver of Defects Implied?

THE question of whether acceptance of a building by the owner operates as a waiver of defective construction is very naturally an interesting one in the building trade.

It has been generally decided by the courts that acceptance of work done under a contract does not necessarily amount to a waiver of defects in performance under the contract.

Use of a building by an owner leaves open the question of whether or not the owner can claim damages for defects. Acceptance of a building by an owner operates as a concession regarding the right of a contractor and raises a question as to whether or not the owner should be allowed to counter claim for defects, or start an action for damages arising from the faulty construction.

The courts of many states have decided in a large number of cases that mere use and occupancy of a building does not constitute an admission that the building is in compliance with the contract nor operate as a waiver of defects.

Of course the conduct of an owner or his agent may be such as to justify a court in inferring acceptance of a building. The fact that an owner has made part payment, however, has been held to be not enough to justify such a view.

There have been numerous cases decided where merely taking possession has been held not to amount to an acceptance or a waiver as, for instance, where possession was taken under protest and where work was done in a cellar underneath the residence of the owner who continued to remain living there.

Where an owner even takes possession of a building with knowledge of defects he is not held to have waived, in some cases.

Where the work is done on an existing building the person performing labor on it is entitled to compensation for the reasonable value of work performed up to the time of its destruction, and if the work was done by a subcontractor, he may recover the amount due him from the principal contractor.

The reason for this is as stated by the court in a recent case, "That when a person contracts with another to build, or to do some portion of the work, in constructing buildings, upon real estate belonging to the owner of such real estate, his taking possession after the other has left the premises cannot be construed as an unequivocal acceptance, although he thereby takes possession of and appropriates to his own use or benefit the labor or materials of the contractor. He must do so as a matter of necessity in many cases or suffer the property to stand idle and unused to the great detriment of all parties and especially to the owner. The most that can be said in such cases is that the act of the party and all the circumstances may be taken into consideration in the determination of the question whether there is an implied waiver of the condition precedent."

George Kaiser, LL.B., our legal adviser, will answer any questions whose solution will aid in clearing up legal difficulties that subscribers may be in. He will answer direct by mail and give his opinion as to the correct procedure. Such of the questions and answers as are of general interest to the trade will be published in these columns.

All inquiries must be accompanied by the name and address of the correspondent, so that he may be answered direct or that he may be requested for further information if necessary to the intelligent answering of his question. No names will be published, only initials or a nom de plume. Remember that this service is free to subscribers.

Address Legal Department, Building Age, 243 West 39th Street, New York City.

Where a building in the course of construction is damaged or destroyed the contractor must bear the loss if he has contracted absolutely and unqualifiedly to erect a building, and if completion is a condition precedent to his right to payment unless the loss occurred through the fault of the owner.

Where the payments are payable in instalments as certain portions of the work are finished and the building is destroyed before completion, but after an instalment has been earned, the contractor is entitled to the earned instalment.

Can Carpenters Refuse to Work on Material Coming from Non-Union Shops?

A recent decision of great interest to the trade which gives unions the right not only to call out their own men but also to induce workmen in other trades to leave work because non-union men are employed or non-union materials are used is the recent decision in the case of Bossett against Dhuy.

Suit was brought by a manufacturer who employed non-union labor to enjoin officers and agents of the union from:

1. Taking steps to compel the members to observe the rules of the union prohibiting them from working on materials made in the manufacturer's shops.
2. Sending circulars to the manufacturer's prospective customers requesting them in making contracts to provide for the employ of union men and the use of union-made materials exclusively, with the suggestion that in this way labor troubles would be avoided.
3. Inducing workmen in other trades to quit work on any building because non-union men were there employed in installing materials coming from non-union shops.

The New York courts held that the members of a carpenter's union not only are privileged to refuse to work on materials manufactured in non-union shops, but also have the right to send notices of their intention to do so to owners, architects, collectors and traders. The court therefore refused to grant the injunction which the manufacturer asked for.

Can an Architect File a Lien?

The question of compensation is naturally just as interesting to an architect as to a man in any other line of business or profession.

In New York, New Jersey, Pennsylvania, Minnesota and Illinois it is well settled that when an architect directs and oversees the construction of a building in accord with the plans and specifications he is entitled to a lien.

If, on the other hand, he acts merely as an architect, he has no right to a mechanic's lien, as that privilege is granted to him only when he performs the duties of a mechanic, foreman, inspector or superintendent, and then his

lien is only for services in that particular capacity.

Except in the states where it is provided by express statute that an architect is to have a lien of his own, he is allowed no lien for simply preparing plans and specifications.

If You Sign a Contract, Knowledge of Its Contents Is Supposed

The Supreme Court of New Mexico held in a recent case that ordinarily it is the duty of every person who is able to read to read a contract before he signs his name to it.

The court also decided that if a person cannot read it is just as much his duty to have the contract read and explained to him. If, therefore, a person neglects to read or have a contract explained to him he cannot deny it unless he can actually show that he was a victim of fraud or deceit.

How "Architecture" Is Legally Interpreted

From A. F., Bismarck, N. D.: I will thank your department for information on the following:

First—What is the legal interpretation of the word "architecture"?

Second—What is the usual business or commercial interpretation of the term "Practice of architecture" at the present age?

Answer—An architect has been defined to be one who makes it his occupation to form or devise plans and designs and to draw up specifications for buildings and structures and to superintend their construction.—Pepler vs. Lauer, 96 N. E. 346-251 Ill. 527.

It has been also defined to mean one skilled in practical architecture, one whose profession is to devise plans or ornamentation of buildings or other structures or to direct their construction. —Young vs. Bohn, 141 Fed. 471.

The word architecture has been defined as the art of building according to certain determined rules.—Louisiana Molasses Co. vs. La Sassler, 52 La. Ann. 2070.

Architecture according to the Encyclopaedia Britannica is:

"The art of building in such a way as to accord with principles determined, not merely by the ends the edifice is intended to serve, but by high considerations of beauty and harmony." — Encyclopaedia Britannica, Vol. 2, 11th Ed., page 369.

In the encyclopedia, pages 369 to 444 are devoted to architecture, and are well worth reading.

Is Contractor Liable for Work When Done in Accordance with Established Practice?

From W. G., New York—I have just been concerned in a case in New York City which I think will interest many builders.

It was decided in a New York City court that where skylights were not detailed, varying from the standard construction, that the owner had no right to expect any other than those of typical and standard construction. A verdict in full was awarded to the roofer who was the plaintiff in the action.

The roofer's contract with the owner called for him to furnish for an agreed sum, among other items of roofing and sheet metal work, ten hipped skylights.

All of the work was completed as agreed and part payment was made to the roofer on it—who heard no complaint from the owner and imagined his work to be entirely satisfactory. Not being in urgent need of money he did not endeavor to collect the amount of his contract in full.

In the course of a few weeks severe snow and rainstorms occurred which the owner claimed damaged his property by reason of snow and rain blowing through the ridge ventilators which had openings of 2 in., and the size of which openings he thought were excessive.

The owner sent for the roofer and requested him to close up the ventilator openings, which the roofer refused to do unless he were paid extra compensation.

He, shortly after this, requested that the owner pay him the balance due him on his contract which the owner would not do, and the case was taken to court for a decision.

On the day of the trial after everybody concerned had been heard the plaintiff had an architect testify that the skylights as furnished were of typical standard construction. The court held that where detail drawings were not furnished construction in accordance with ordinary usual practice was to be expected. Therefore verdict was awarded to the roofer.

Efficiency in Construction and Arrangement of Basement—Part I

By Arthur Weindorf, Architect

SOME of the following suggestions if carried out will with very little expense place this sort of a place in a convenient and livable place.

In these days of scientific housekeeping when the elimination of useless labor is secured through a common sense arrangement of the working plant it is high time to give careful attention to the possibilities of the cellar.

A basement or cellar should be planned to extend under the entire house, as it is usually necessary to carry the foundation walls deep enough in the ground to secure footings below the frost line, and usually a foot or more is required for the basement. The cost will be very little more if the basement is placed under the entire house, and the result will be drier and healthier rooms above and more room and a better arrangement for basement.

The basement should have a headroom of at least 7 ft. in the clear. This will allow for sufficient room for the carrying of heating pipes, etc., and afford plenty of space so that it will not be necessary to dodge pipes, etc., every time one goes in the basement. See Fig. 1.

The basement should be about 4 ft. 6 in. below ground. This will allow for good size windows 2 ft. deep with a 6 in. sill, which makes the basement ceiling 2 ft. 6 in. above the ground line. Of course, there are no set rules for this, and each builder must figure out dimensions himself, giving consideration to the fact that the basement windows should be of a good size so as to allow plenty of light and be so arranged that the basement can be properly ventilated.

If it is necessary to carry the basement a greater distance below ground, the windows should be a little larger and area walls built around same, the areas being properly drained.

Many basements that are poorly constructed fill up with water during a rainy spell owing to the negligence of the contractor in not finding out the conditions of the soil or if basement will be below the water level in the locality in which building is being constructed, thereby causing a great deal of trouble and extra expense to the owner.

If there is any danger of water getting through the foundation wall or basement floor it will be necessary to use a water-proofing mixture at this part of the work. If the walls are only waterproofed it may have a tendency to turn aside the water and pass it up through the basement floor unless the floor is also waterproofed.

To make the outside of the foundation or basement walls damp-proof it will be necessary to waterproof it by using some well-known brand of waterproofing paint or compound. This material should be applied to the outside of the foundation

or basement wall, where it will insure a waterproof job. The floor can be waterproofed by laying concrete 2 or 3 in. thick, and upon this laying tar felt, which should be mopped to the concrete work with a waterproof compound, which latter is a tarry looking material. Upon this is laid 3 or 4 in. of concrete with a finished surface dressing on top.

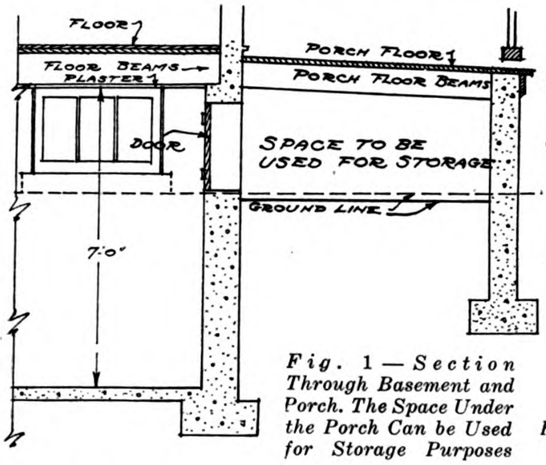


Fig. 1—Section Through Basement and Porch. The Space Under the Porch Can be Used for Storage Purposes

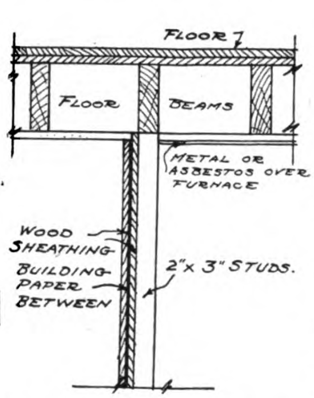


Fig. 2—How to Make a Dust-Proof Partition

There are also many waterproof cement mixtures on the market that have been used under unusual conditions to good advantage.

Basement walls can, under ordinary conditions, be made damp and waterproof by providing a drain pipe around the outside of the foundation walls at the bottom. This drain pipe is known as "agricultural tile," and is laid with a loose joint so that the surface drainage that runs down the outside of the building sinks into this drain pipe and is carried away to the sewer or well, thereby preventing the water from entering the basement and causing trouble.

Where solid basement walls are carried around under the outer edge of the porch it will not be necessary to carry porch walls down the full depth of the cellar. This space under a porch can be utilized for the storage of lumber, boxes, etc., by the leaving of an opening in the foundation wall between the underside of porch and basement and arranging same with doors so same can be closed off, as shown in Fig. 1.

A plastered ceiling in the cellar is a great advantage, as it keeps the first floor of the house warmer and makes the cellar easier to keep clean. A brown coat of plaster answers the purpose, but the white finish does not add much more to the cost and is worth the difference many times in appearance and cleanliness.

Plaster or wall boards are also a good material to use for this purpose and are easily applied. Care should be taken in sealing up all joints so as to protect the rooms above from dust, which will very easily find its way through the smallest opening.

All timbers for partitions should be smooth and should be run vertical to prevent the collection of dust. Partitions should be built up of matched timbers on both sides.

The masonry walls should be neat and smooth as possible; this will not add much to the cost and will be appreciated many a time. A foundation wall that is roughly constructed is detrimental to the mason who puts in this sort of a job, as it is the one part of the whole job that the owner constantly sees every time he goes into the basement. What collects more dust and is more difficult to keep clean than a rough basement wall?

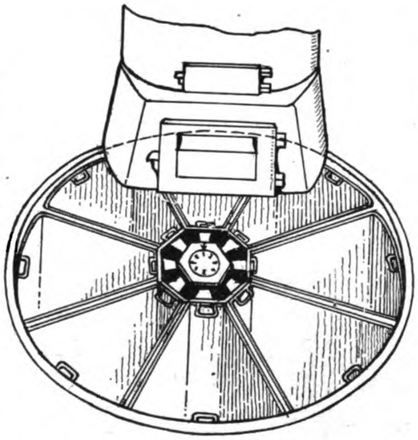


Fig. 3—A Convenient System for the Storing of Ashes

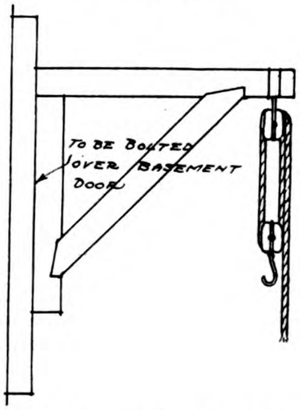


Fig. 4—A Crane Useful in Lifting Out Heavy Ash Barrels

The basement floor should be of concrete and finished off smooth with cement. This material will stand the best wear if properly applied. A number of floor drains should be set in floor so that the basement floor can be flushed from time to time and kept clean.

The walls, ceiling and partitions of a basement should be painted. It is good policy to paint the cellar every four or five years so as to keep this part of the house in a healthful condition. A waterproof paint should be used, which will enable the owner to wash down walls with a hose in cleaning. There are many kinds of waterproof paints on the market for this kind of painting.

The chimney should be constructed if possible near the center of the house. This arrangement will help to heat the rooms more efficiently and a better draft will be secured, also the location of the furnace will be central and its pipes will radiate equally in all directions. Flues should be of sufficient size to take care of furnace and lined with vitrified flue lining.

The furnace room should be just large enough to allow for the shoveling of coal and the handling of ashes, no space being allowed to go to waste here. This room should be enclosed by a dust proof partition, which can be constructed of two thicknesses of wood sheathing with building paper between, as shown in Fig. 2. Wall boards with a wooden cleat over joints will be found exceptionally good for this class of work. The boards in all cases should be tightly fitted to the ceiling.

A sheet of asbestos or metal should be attached to the ceiling over the furnace.

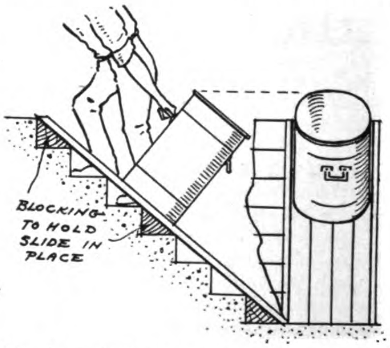


Fig. 5—Ash Barrels Can be Easily Handled on a Slide

The coal and wood bins should be located near the heating apparatus, being located in one corner of the basement and having access to one window. The coal bin should also have dust proof partitions and a small sliding door should be arranged for the removal of coal. The bin should also have a good size tight fitting door.

The window to the coal bin or the coal chute should be located so that the coal wagon can be driven directly up to the chute for the unloading of coal. The

window frame and sash should be of iron and glazed with wire glass; this will be found more durable than the ordinary wooden coal windows.

Taking care of the ashes should now be taken into consideration. Many owners take ashes from the furnace every day, sift same and carry them out, while others have a number of barrels for storing ashes in the basement and take them out at intervals.

A convenient patented system for the storing of ashes is that known as the rotary ash receiver shown in Fig. 3, which is built into the basement floor under the heater, so as to catch the ashes that drop from the grate each day. When one can is full the receiver is rotated to bring an empty one under grate, and when all cans are full they are emptied. A plate covers the cans on the level of the floor in front of the furnace.

In Fig. 4 is shown a crane that can be constructed outside over basement door and with blocks and tackle will be found very useful for lifting out the heavy barrels of ashes from the basement.

The barrels can also be taken out on a slide as shown in Fig. 5. Barrels can be pulled up the slide, this is much easier than the lifting of the heavy barrels of ashes up the stairs. This slide can be constructed of 1¼ in. by 6 in. tongued and grooved boards and should be made just a trifle larger than the diameter of the barrel. The slide should be supported by blocks that fit the riser and tread of the stairway, as shown in sketch. Slide can be removed from stairs when not in use.

It will be found by examining the ashes after they are shaken out of the furnace that the ashes contain a great deal of good and partly burnt coal, and with a little extra trouble a great deal of this can be saved by the use of the built-in ash sifter, as shown at Fig. 6. The ashes are shoveled into the door shown at "A" and the ashes travel down the ½-in. wire mesh, the fine ashes falling through the mesh into compartment "B" and the cinders and coal continuing down wire mesh and going into compartment "C." The door at one end of the sifter is used to remove the ashes to the barrels and the door at the other end is used to remove the coal and cinders. The sifter should be tightly constructed so that the dust will not fly all over the basement. The wire mesh should be stretched tightly so that all ashes and cinders will rool off. It is always a good method to sprinkle the ashes before they are put through the sifter, which prevents the dust from flying all over.

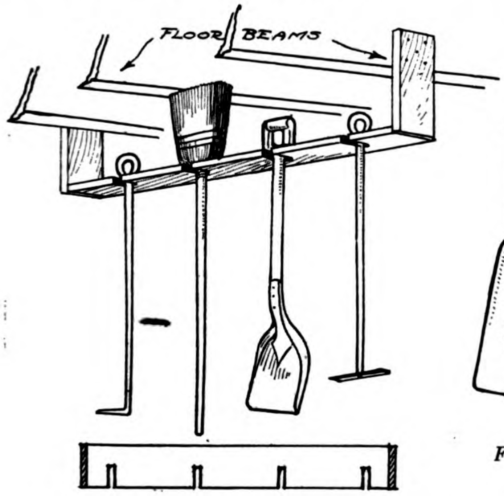


Fig. 9—Handy Method of Keeping Shovel, Poker, etc., in Proper Places

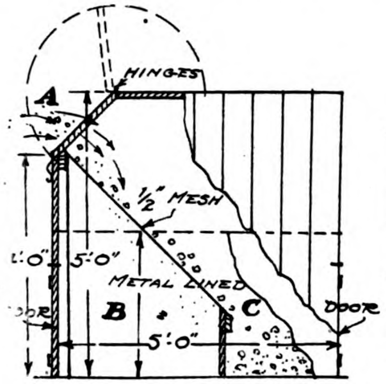


Fig. 6—An Ash Sifter Will Save Money by Conserving Coal

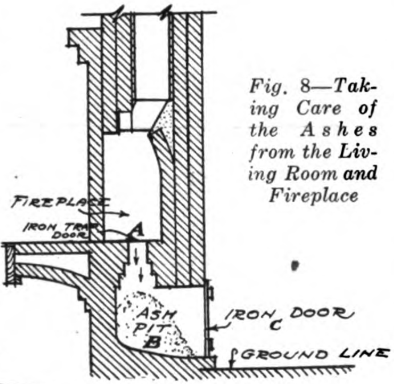


Fig. 8—Taking Care of the Ashes from the Living Room and Fireplace

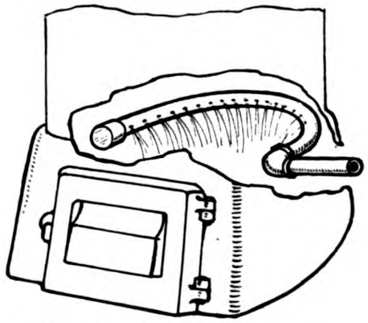


Fig. 10—Keeping Dust Down by Sprinkling Ashes

The kitchen range can be connected with an ash sifter as shown in Fig. 7. The ashes drop down the chute "A" that is connected to the ash pit of the kitchen range onto the ½-in. wire mesh, the fine ashes dropping through to compartment "B" and the coal and cinders going into compartment "C." The door at one end is for the removal of ashes and a door at the other end for the removal of the coal and cinders and which can be taken care of in the basement, thus avoiding trouble and dust in the kitchen. These ash sifters can be built up out of tongued and grooved sheathing boards.

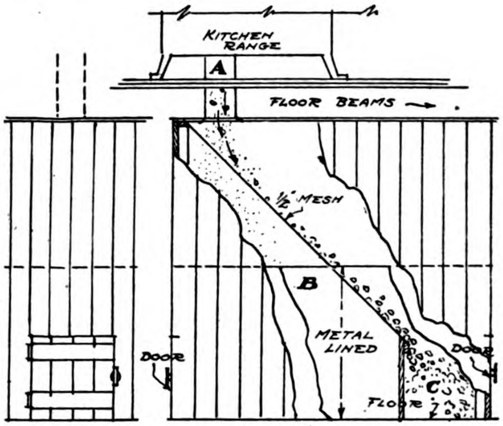


Fig. 7—A Convenient Ash Sifter for the Kitchen Range

Fig. 8 shows how the ashes from the living room fire place can be taken care of from the outside. The ashes are dropped through an iron door "A" in the floor of the hearth, the ashes passing in the compartment "B." This arrangement is admirably adapted in connection with a living room fire place that is burning wood, as the wood ashes can be removed from the compartment "B" through the iron door "C." The wood ashes can be used as a fertilizer. This arrangement will keep the dust out of the living room. The interior of this ash pit is to be finished off with cement with a smooth surface.

The shovel, poker, broom, etc., can each be kept in its proper place as shown in Fig. 9. A piece of timber about 1¼ in. in thickness by 4 in. or 6 in. in width and measured off to hold all the implements that are used should be secured. This is cut with grooves, as shown in sketch, so that the implements will fit snugly in the grooves and hold in position. This arrangement can be attached to ceiling beams as shown, or fastened to wall.

Fig. 10 shows how the dust can be kept down by the use of a sprinkler in the ash pit. A ½-in. piece of wrought iron pipe should be bent around to fit the size of the ash pit. The pipe should then be drilled with 1/16-in. holes about one inch apart on the inside as shown in sketch. This pipe can be connected with the supply pipe and a cock arranged just outside of the furnace so that same can be operated when the ashes are to be sprinkled.

(To be concluded)

Some Echoes of the Noon Hour—IX

By Edward H. Crussell

Karr Used to Get Sick and Lay off Work Whenever There Was Any Hard Work to Be Done

"I SEE by the papers," said Shorty, as the last piece of his pie disappeared from view, "that they are advertising for men in the shipyards. Pretty good wages, too; patternmakers seven dollars a day. Wish I was a patternmaker, I could do with some of that seven-dollar stuff. I'll say I could."

"Well, why don't you go after some of it then?" queried Scotty, winking at the kid.

"Foolish question number so and so," answered Shorty. "I don't go after it because, as I've already explained, I'm not a patternmaker."

"I don't see what that has to do with it," grinned Scotty. "I notice the Old Man has you down on the payroll as a carpenter and if you didn't tell him you was one, who did? I'll swear it wasn't me."

Shorty joined in the general laugh and then said cheerfully, "I see what you mean. That tongue of yours, Scotty, sounds like a runaway Ford. Some day, I'm afraid you'll find it talking you into more trouble than it'll be able to talk you out of."

"Yes," admitted the other, "I know, but I'm pretty careful with it. I only say that sort of thing to three kinds of people; those I can lick, those I can run away from, and those who are too good-natured to resent it. I'll leave it to you to say which class you trot in."

"Let's go back to the first subject," advised Bliss. "For my part, I don't see any reason why Shorty, or any of the rest of you, shouldn't apply for a job as patternmaker if you feel like it. Patternmaking is no miracle-working trade. I've known a number of carpenters who turned patternmakers, but I've yet to hear of the first patternmaker who turned carpenter. I never had any leaning toward the business myself; too messy a job to suit me; always struck me as being more of a habit than a trade; gluing on little sticks of wood and chiseling them off again; working on a job the size of this nail keg for a week or more; none of it for mine, I like to see some result for my labor."[*]

"'I have been young and now am old,'" quoth Old George. "I've had to change my mind many times about many things, but there's one thing I don't expect to have to change and that is, the conviction that no one in the woodworking trades, patternmaker or otherwise, gets a dollar until he has earned it. And I am prepared to argue that if there is anything in this seven-dollars-a-day yarn, the men who get it have to do something more than stand around and look wise."

"When it comes to changing opinions and convictions," said Bliss, "If I haven't changed mine as often as you have, I expect it's because I haven't had as much time to do the changing in. But with all that said, I repeat, there's nothing wonderful or miraculous about patternmaking; if there was, half of the patternmakers I know wouldn't be able to hold their jobs."

"Well! That's certainly one way of judging the matter," said the Kid, who had been an interested listener. "Where did you learn that system of logic, Bliss?"

"I learned it many years ago," was the reply, "from a young fellow not much older than you are. At the time we were both working in a construction gang and Dave (which was the young fellow's name) was firing the boiler of the hoisting crane.

"The engineer for the crane, a fellow whom we will call Karr, was an ignorant, illiterate duffer, who had learned to run a hoisting engine by rule of thumb, and was at great and ostentatious pains to keep his knowledge secret. He naturally had an exaggerated idea of his own importance, and caused much trouble by pretending to be sick, and laying off whenever there was something special for the crane to do. Being in a place where engineers were scarce, the foreman put up with this for a while, but one day, when the indisposition of the engineer was holding up the entire gang, he said to Dave: 'Here, you've been on that crane long enough to know something about it; take hold and see if you can't handle it long enough to get these bents up!'

"As I say, I was pretty young at the

At Lunch the Gang Kidded the Life out of Karr

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[*] I sincerely hope that no patternmaker among my readers will think that Bliss' ideas on this subject must necessarily be the same as mine. E. H. C.

time, and having been impressed by the attitude of the engineer, I expected to see Dave refuse, or at least, make some objection. But not a bit of it. He 'took hold' and got along fine. At noon we were all seated at the dining table, and in order to make things interesting for the engineer, who was seated with us, everybody made much of Dave, and complimented him upon his skill with the crane. You can imagine that the wit was more pungent than pointed, but Dave brought matters to a climax by blurting out: 'Oh h—l! I knew there couldn't be anything hard about running a crane or Karr couldn't have done it.'

"The idea was new to me at that day, but many a time since when I've been in a tight place and had doubts of pulling through, I've thought of Dave's words; have taken stock of those who were doing, or had already done, the same thing, and have said to myself, 'there can't be anything to that, or Karr couldn't have done it.'

"I don't mean to suggest that a fellow who had never heard of a pattern, or seen one made, could march in offhanded and hold such a job from the start, but I am satisfied that any skilled woodworker, who was really anxious to do his bit, either as patternmaker, shipbuilder, airplane builder, or in any other line, could soon find some way of getting his wish gratified. All that he would need would be the nerve to apply for the job and the willingness to learn. I leave it to the boss here, to say if I am right or not."

The foreman shook his head deprecatingly. "Why bring me into it?" he asked: "You appear to me to be getting along alright by yourself. However, while you get your second wind, I'll just say that I have read somewhere, that nerve is scarcer than brains. One of our steel magnates has been accused of saying, that he could buy brains, coupled with a college education, for forty dollars a month; but that the proper kind of nerve could not be bought for any money. In my experience, I've found the chief trouble to be, that nerve and brains too seldom go together. The fellow who knows how, is afraid to tackle the job, and the one with nerve enough to attempt it, doesn't know how to do it.

"I might also say, that willingness and industry are two qualities that are often accepted by executives in lieu of special skill. In competition with the skilled workman who is indifferent, or indisposed, the unskillful but willing workman will win out, eight times out of ten. Bliss' story is a good illustration of this, and we can easily imagine that if the foreman of that gang had suddenly been called upon to discharge either Dave or the engineer, he would have kept that man who had helped him out by showing willingness. Perhaps Bliss has something to add to his tale that might enlighten us upon this point. How about it, Bliss? How did the matter turn out? Did Dave get the other fellow's job?"

"Well, no," was the reply. "It didn't turn out just that way. The work we were engaged upon was the building of a set of coal elevators, used for unloading coal from barges, and when we had them finished Dave applied for and secured a job as hoisting engineer on one of them. Karr was offered a job also, but didn't have nerve enough to attempt the new line of work. The last I heard of Dave, which was some three years later, he was superintendent of the entire works, and had patented some improvement in the machinery that was bringing him in a snug royalty. Of course that took him out of my class and I lost track of him."

"I remember another incident, illustrative of what willingness will do for a fellow," said the foreman, as Bliss concluded his remarks. "Some years ago I had charge of a job out in the country. There was only a little concrete work to do on the job and rather than let a sub-contract, the boss decided we would do it ourselves. One night, just as we were about to quit, a young fellow struck me for a job. 'What can you do?' I asked. 'Well,' said he, 'I'm a carpetlayer by trade, but I'm dead broke and got to have a job. I'm willing to do anything.'

"'Ever mix any concrete?'

"'No, but I'm willing to try. I'll never be able to learn how any younger.'

"'All right,' said I, 'show up here in the morning.'

"He showed up in the morning, and a poorer exhibition of shoveling I never want to see. I found out later that up to that time he had never done anything harder than clerk in his father's drygoods store. At the time he told me this he also naïvely explained, that he knew, if he said he was a drygoods clerk, I wouldn't give him a job, and as he knew a little about carpets, he had taken the easy chance that I didn't have any to lay and wouldn't find out the difference, so said he was a carpetlayer.

"Well, any of you that have tried it, know that mixing concrete is no sort of a snap, even for those whose muscles have been toughened by some other form of manual labor, and you can imagine what it was like to a fellow who had spent all his days behind a counter. Yet he never weakened for a moment. Long before the end of the day his hands were full of blisters and it must have been agony for him to pick up his shovel. Yet he always picked it up, and didn't try any of the old time-wasting tricks, such as going away every five minutes to get a drink, and others that I know of and you can guess. However, there is little room for sentiment in business, and while I couldn't help admiring his gameness, I've always figured that it's no part of a foreman's business to be charitable with the boss' money, and as, with all his efforts, he was not delivering the goods, I had decided that at the close of the day I must let him go. The end of the day came along in due course, the last batch was mixed, and the boys were picking up their belongings preparing to departure, when I decided to have the mixing board moved to avoid the danger of some passerby falling over it. The new man was farther from the board than any of the others and was half in and half out of his coat; he had probably just finished the most strenuous and painful day of his entire existence and must have been thanking Heaven that it was over; yet with all this, he was the first man to get hold of the board, and I at once decided that sentiment or no sentiment, he had the right stuff in him and was too good a man to let go.

The Chap Had Never Done Anything Harder Than Clerk in a Store

"I don't think I'd make a good foreman——" blurted out the Kid, and then paused awkwardly.

"I know, Kid," smiled the foreman. "It does sound hard-hearted, but to be just, a foreman has to walk the line exactly that close. He dare not let his feelings permit him to play any favorites. If he does, not only is he cheating the boss who pays the wages, but also the other men who are compelled to do a full day's work for the same wages the favored one is getting."

"Yes," broke in Scotty, "the foreman has to be like old Johnnie Walker's gatepost, so plumb that he leans over backward. But there should be something more to your story, boss. What eventually became of the fellow? Did he turn out as well as his first day would lead us to suppose?"

"My story," said the foreman, looking at his watch, "ends something like the one Bliss told us of. The young fellow had had a foolish falling out with his dad and had left home in a huff. When I found this out I induced him, after much argument, to act the part of the prodigal son. We corresponded for a while, but eventually I lost track of him."

"Don't forget what I told you," said Bliss, as they started for their respective places; "and don't let a lack of nerve prevent you signing on as a shipyard volunteer. Myself, I've already signed."

(*To be continued.*)

The McCann Building, New Rochelle. Henri Vallet, Architect

A Business Building of Attractive Architecture

ATTRACTIVE architecture in any business building constitutes a feature of decided value to the owner when he offers the space in the structure to tenants catering to a high class clientele, and who realize the psychological advantages resulting from good architecture.

Especially is this true with a firm engaged in the real estate business, as are several of the firms located in this building. The person who desires to rent or buy a residence naturally wishes to secure good construction, convenient arrangement and architectural excellence. He will more confidently enter a real estate office which breathes forth these features, for he instinctively feels a very real relationship between the building occupied by the broker and the houses which the broker has to offer. This is true in all lines of business, but the firms who must capitalize the psychological leanings of their clients are better capable of realizing this fact than are those engaged in more prosaic trades.

The building forming the basis of the present article gives this impression of solid substantiality—an impression whose psychological value is evidenced by the class of tenants renting the various parts of the structure, all of whom must necessarily benefit from the value of first impressions.

The combination of white pine painted white, gray brick and limestone sills and lintels of the second story windows form a color and material combination which is decidedly attractive.

Three square white pine columns, simply panelled, together with the brick walls at the sides of the building, constitute the apparent supporting members. The end brick walls or piers each have three horizontal bands of gray colored brick, which relieve their plainness. Above each of the three windows on the main story, which are spanned by steel beams, are placed well proportioned ventilating transoms, which help remove the heated air at the ceiling level of the offices and also give added light to the interior. Below each main window a course of three panels gives a sense of individuality to each window, which adds largely to the attractive appearance of the design. One of the panels below each window is of frosted glass, which admits light to that part of the cellar immediately below.

Each window is provided with a show space having a parquet floor, and is semi-divided from the office at the back by a low panelled oak partition, thus giving a personal touch to the window.

At the left of the building is the main

Office "W"

The Office Designated as "O" in the Accompanying Floor Plan

entrance, which leads to the offices at its immediate left and right and also to the rooms upstairs. The door at the right of the building leads only to the particular office into which it opens.

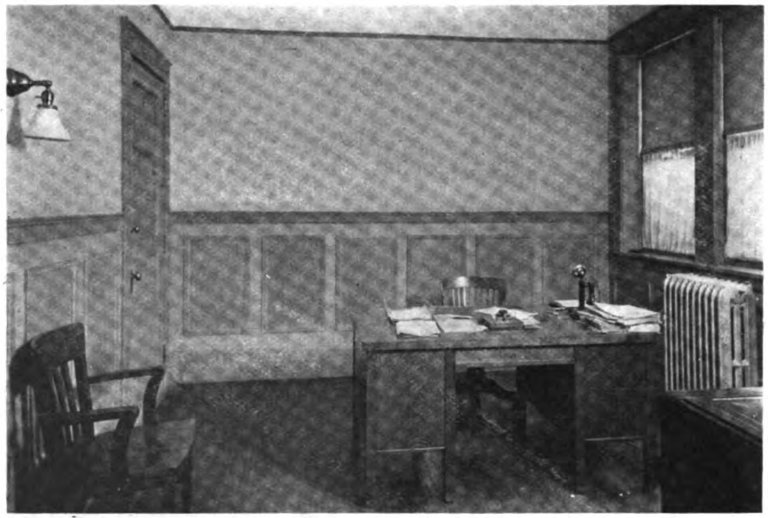
Above the main show windows is a sheet metal cornice whose well proportioned dentil course and molding form the finishing touch to the main story.

The upper story is provided with a triple window at each end, each sidelight being hinged at the stile. The central light is centrally pivoted, as its large size would not permit of its being easily hinged, as are the others. The window in the center of the building is also pivoted in the center.

The prominent feature of these windows is the arrangement of the lintels. The keystone of each flat arch is wedge-shaped and is carried well up above the arch. At the side the stone springers are carried a short ways down the side of the opening.

The crown molding of the main cornice is similar to that of the lower story cornice, its distinguishing characteristic being a modillion course below which is a modillion mold and a dentil course, these dentils being larger than those in the lower story cornice. A simple panel and foot molding complete the cornice. A comparison of the lower and upper story cornices will show how similar they are and yet how the main features are contrasted in a manner which brings a pleasing variety to the several details.

The floor of the vestibule and lower floor corridor is of buff colored Asbestolith composition.



The Private Office Communicating With Office "O"

The office at the center of the building has its walls panelled 7 ft. high with oak, the panel spaces being of colored plaster. Above the panelling is the usual three coat white plaster. The floors throughout are of oak and are double, building paper being laid between the rough and finished floors. In back of this office is a private office, the trim of which is oak finished silver gray.

Each of the other main offices is panelled in a similar manner. A metal ceiling is used in one of these offices.

Two offices are placed in the back of the building, one of them being occupied by the architect who designed this structure.

The stairs have oak treads, oak newels, handrails finished in silver gray, and oak balusters finished in silver gray.

Doors and windows are of cypress. The entrance doors are of white pine and are provided with brass kick plates.

The offices on the second floor open from a central hall lighted from above by a skylight, and the trim here as well as in the lower hall is of oak finished in silver gray. Doors with frosted glass panels leading to the offices also form a means of providing light to the hallway. Ventilating transoms are placed above each door.

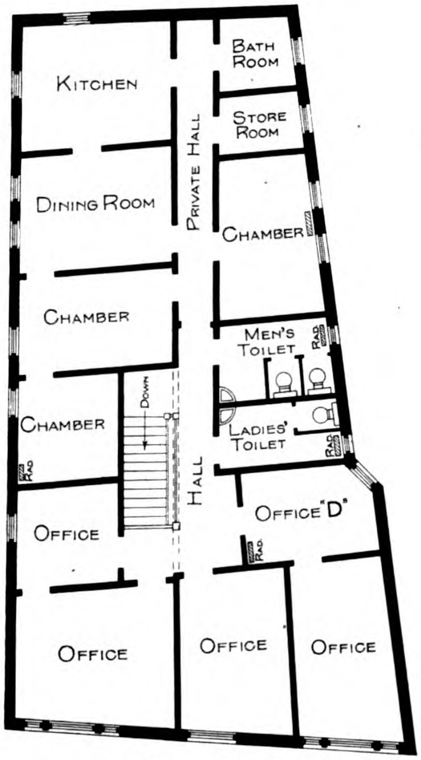
The rear of the second floor is devoted to the janitor's quarters.

The roof is of slag.

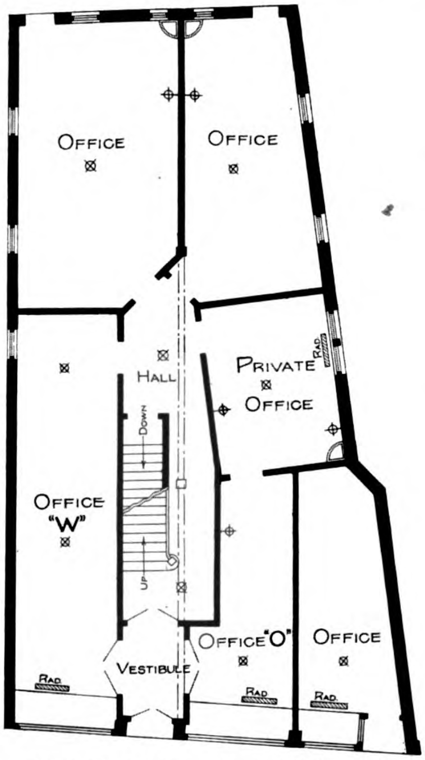
The building is a remodeling job, it having originally been used as a billiard and pool parlor. The remodeling was done in accordance with plans prepared by Henri Vallet, architect, 11-13 North Avenue, for James D. McCann, 11-13 North Avenue, New Rochelle, N. Y.

The Second Floor Hall, Looking From the Head of the Stairs

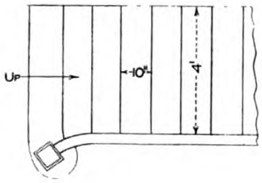
Office Located at the Left Hand Side of the Rear of the First Floor. Occupied by the Architect Who Designed the Structure



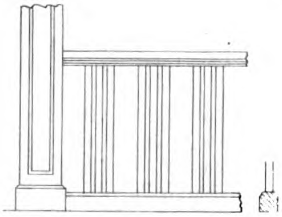
Second Floor Plan. Scale 1/16″ = 1 ft.



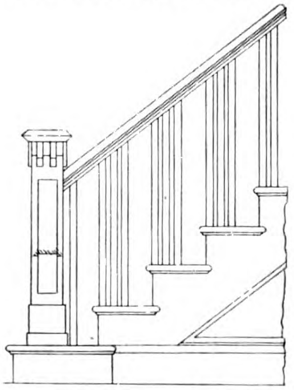
First Floor Plan. Scale 1/16″ = 1 ft.



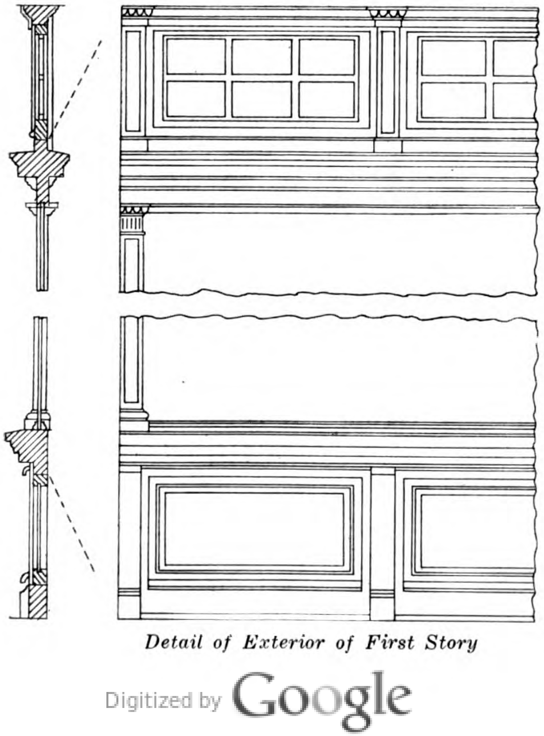
Plan of the Stairs



Elevation of Railing on Second Floor
Scale 3/16″ = 1 ft.

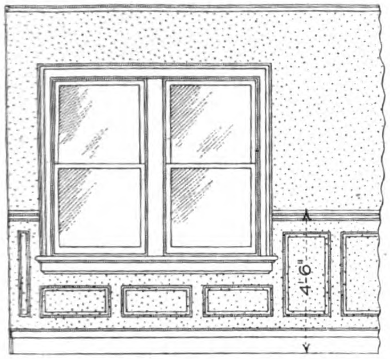


Elevation of Stairs
Scale 3/16″ = 1 ft.

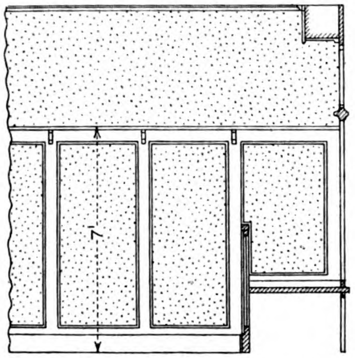


Detail of Exterior of First Story

Elevation. Scale 3/32″ = 1 ft.



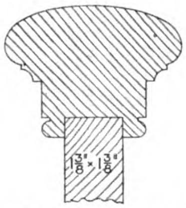
Detail of Private Office. Scale 3/16" = 1 ft.



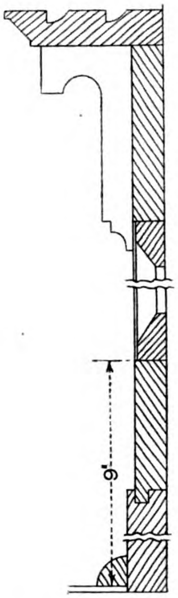
Elevation of Paneling in One of the Offices. Scale 3/16" = 1 ft.

Detail of Top of Paneling in Private Office

Horizontal Section of Paneling in Office



Cross Section of Handrail



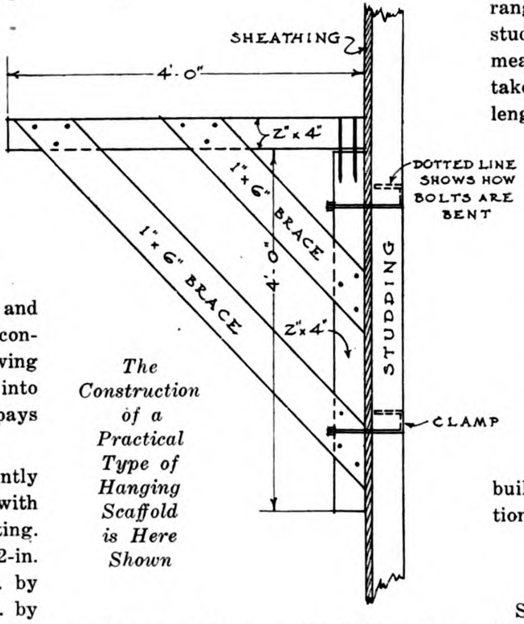
Cross Section of Paneling

Making the Hanging Scaffold; Its Advantages

By E. V. Laughlin

ALMOST without exception those carpenters who have taken the trouble to provide themselves with an ample number of hanging scaffolds have reason to feel satisfied with themselves, for the advantages of such scaffolds are numerous. For one thing—and a very important thing nowadays—there is some saving of material. In the building of temporary scaffolds there is invariably the loss of material through breaking, splintering and the careless driving of nails. Then again the amount of labor involved in erecting and demolishing temporary scaffolds is considerable. The hanging scaffold, owing to the ease with which it is put into place, saves all this, and indirectly pays for itself many times over.

Hanging scaffolds are conveniently made of 2-in. by 4-in. scantling, with brace material of 1-in. by 6-in. sheeting. Each scaffold so made requires two 2-in. by 4-in. pieces 4 ft. long, two 1-in. by 6-in. pieces 3 ft. long, and two 1-in. by 6-in. pieces 5½ ft. long. These are assembled as shown in the figure. In addition there must be provided for each truss two bolt guards for attaching the scaffold to the side of the building. The local blacksmith can easily fashion these guards. The expense for each ought not exceed 25 cents. For the entire scaffold the material, even at the present high prices, will scarcely exceed $1.50 each.



The Construction of a Practical Type of Hanging Scaffold is Here Shown

The figure, no doubt, is perfectly explanatory of the structure of the scaffold. The iron bolt guards are so arranged that they may be clamped to the studding, thus giving a very large measure of security. If due care is taken to have these guards of ample length they may be accommodated to either 4-in. or 6-in. studding. They may safely be made of rod iron ½ in. in diameter.

In placing the scaffolding holes are bored through the sheeting at proper places to receive the bolt guards. The U-end of the latter are made to grip the studding tightly while the other end is passed through holes in the vertical piece of the scaffolding. When the nut is tightened the scaffold is drawn tightly to the walls of the building. It is then in the proper position to receive its load.

Weights of Roofing

Slate weighs from 650 to 800 lb. per 100 sq. ft., tile between 950 and 1200 lb. per 100 sq. ft., and asphalt shingles average 220 lb. per 100 sq. ft., which is about the same weight as the equivalent in wood shingles. Prepared roofing in rolls varies from 35 to 100 lb.

Department of

Masonry Construction

CONCRETE, BRICK, ETC.

Practical Ideas Which Will Help You Do A Quicker and Better Job

How to Build and Fireproof with Hollow Tile—I

Approved Practice That Can Be Safely Followed by Architects and Builders

Fig. 1—A Type of Hollow Tile Block

The First Article of a Series Dealing with This Very Important Subject

By J. J. Cosgrove

IN the study of law, whenever a student felt the growing importance of his knowledge and began to put on airs, the Professor had a way of bringing him back to earth with the simple question, "What is the rule in Shelley's Case?"

In like manner, if you want to start something among a lot of contractors and builders, just ask them what are the four modern essentials of a building.

Opinions will differ, of course, according to the perspective of the person; but if I were to lay them down in the order of their importance, I would say: strength; safety from fire; lightness of construction, and conservation of space by the use of thin walls.

As the last shall be first, so the first shall be last; and we will consider the four essentials in the reverse order of their enumeration.

The thickness of the walls of a building is the last essential enumerated, and apparently the least in importance; yet it has not only influenced but actually revolutionized the other three.

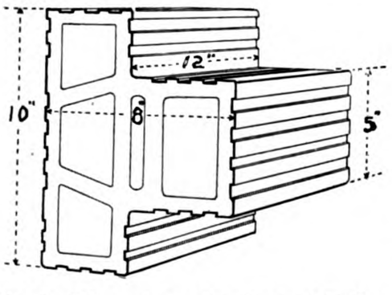


Fig. 2—Dimensions of a Type of Hollow Tile Block

When cities were small and land was cheap, architects built massively, and walls of tall buildings were sometimes several feet thick. As cities grew in size, however, and city property sold by the square foot instead of the acre, it became necessary to make every square foot of surface pay in rentals, and not only on one floor but on many.

But the taller the buildings, under the old order, the thicker the walls had to be to support them, and thus much of the building plot was taken up with masonry walls. This defeated to a great extent the object of building tall structures, so architects and engineers commenced looking around for a new type of construction which would combine all of the strength of solid masonry, or as much of it as was needed, with light floors, thin walls, and a skeleton that could be carried to great heights.

This brought into being the steel frame building, and, as strength, safety and lightness were necessary elements in this type of construction, brought about the evolution of hollow tile building blocks.

And it is the evolution of hollow-tile blocks that will be treated in this series—hollow tile in all its phases from its structure to its cost. Heretofore hollow tile construction has been handled to a large extent by specialists in that type of construction. Now, however, the demand for the material is becoming so general that contractors in remote regions must be able to estimate the cost profitably and handle the material economically.

Hollow-tile blocks are used in two entirely different capacities; these are structural and fireproofing. Of course as a structural material the blocks are fireproof, but that is incidental to their nature. When used for fireproofing it is NOT used structurally but to protect less refractory materials.

These two functions of hollow tile blocks will be separately treated, but we will first take up consideration of the blocks for purely building or structural purposes.

There are two distinct types of building blocks used for the bearing walls and partitions of all kinds of buildings from residences to hotels, factories and business structures in general. The first of these types is shown in Fig. 1. The second in Fig. 2. Both of these types have given perfect satisfaction in practice, and both are well worthy of a better acquaintance. It is not the block alone, however, we must get on speaking terms with, but we must know it in relation to the building when laid up in a wall.

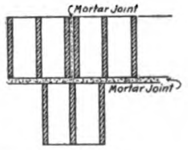


Fig. 3—This Type of Hollow Tile Block Does Not Have a Firm Bearing

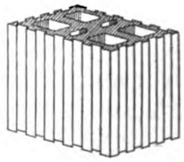


Fig. 4—A Good Type of Block Affording Adequate Bearing Surface

The first impression made on a builder when he has little or no experience of hollow tile construction is that the hollow blocks are lacking in strength. That on account of their lack of solidity they are frail and will crush like an egg shell. Let us see how that proves out in practice, and in test.

It might be well to point out in passing that hollow tile building blocks of the type, Fig. 1, are to be set on end; they are not intended to be set on side or edge, and will crush under one half their load when laid that way. For bearing walls, then, always set this type of hollow block on end. A tile block set this

way will sustain a load of over 160,000 lb., or 80 short tons, without failing. In other words it is safe to assume that hollow tile building blocks set on end will not crush under a load one ton per square inch of material actually bearing the load.

So much for the strength of the individual tile; but hollow-tile blocks are not used individually. It is the strength of the structure when laid in a wall that the architect and builder are interested in.

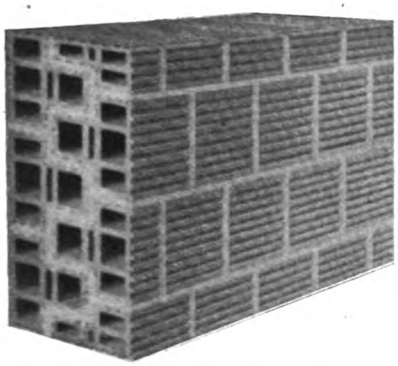


Fig. 5—Interlocking Hollow Tile Laid in the Wall

It may be stated, then, that it is good practice to limit the height of hollow tile bearing walls to fifteen times the thickness of the blocks. According to that formula, the maximum height of bearing wall of 4-in. hollow tile would be $15 \times 4 = 60$ in.; of an 8-in. hollow tile wall, $15 \times 8 = 120$ in., or 10 ft. Then, the total allowable weight a 4-in. bearing wall will carry should not exceed 200 lb. per square inch of material in its cross section, and this weight should include the weight of the wall itself. As there are approximately 39 sq. in. of area under compression in a 4-in. wall, this gives a permissible load on a 4-in. hollow tile bearing wall 5 ft. high of 7800 lb. per lineal foot. A hollow tile bearing wall built of 8-in. blocks has a higher permissible load per square inch of cross section. An 8-in. wall of height not greater than fifteen times this thickness of the block will safely bear a load of 400 lb. per square inch of tile section.

As the strength of a tile wall depends on the number of square inches in each block that have a bearing surface, it is important to so bed each block in mortar that the shell and webs will all bear equally. It might be well to add in passing that the outside walls of a hollow tile block are known as the shell, and the cross partitions as the webs.

Equally important is it to have some surface for all the four sides of the shell and the webs to bear upon. By reference to Fig. 3, however, it will be seen that when laid in a wall, the end shells of the two adjacent blocks lack firm bearings. The cross partitions in the tile are approximately the same width as a vertical mortar joint, so that the mortar alone has a firm bearing while the end shells have bearings only where they cross webs.

To correct that seeming weakness in hollow tile construction, tile manufacturers make blocks, Fig. 4, with double cross webs at the center spaced about one inch apart. When these are laid in a wall, web and shell of all blocks have firm bearings throughout almost their entire cross section. The value of this additional cross partition or web will be realized when it is known that a wall built of these blocks is approximately 2½ times stronger than one built from ordinary blocks. However, the difference is more fancied than real so far as ordinary construction is concerned, for the single web blocks have so much strength to spare that a wall built of them if properly proportioned is never taxed to anything like its limit, but usually possesses a factor of safety of about eight.

It is well to know the different types of blocks that can be had, however, what they will stand, whether there is danger of them collapsing under the conditions used, and what blocks will give greater strength if a stronger bearing wall is needed.

The interlocking tile, previously mentioned, is laid on its side instead of end, yet possesses as much strength as the end-construction tile. This is due to the fact, as may be seen in Fig. 5, that when laid in a wall the shells and webs are all in line, one above another, so they are all bearing surfaces. The strength of the individual blocks is thus maintained, and is not reduced or weakened when laid in a wall. Numerous large buildings many stories in height have been built of these tile.

The peculiarity of hollow tile building blocks over bricks lies in the fact that special blocks are provided for water tables, belt courses, door openings, window jambs, sills, lintels, corners and caps. These special blocks, in turn, while they are the same in a general way for ordinary hollow tile and interlocking tile, yet differ in detail, so it will be necessary to consider them separately and in connection with the blocks with which they are to be used.

Before taking up the subject of details, however, it will be well here to point out the fact that hollow tile blocks are made in three qualities known respectively as *dense, porous,* and *semi-porous.*

Dense hollow tile has a dense texture or body and possesses a low degree of absorption. It is not materially affected by exposure to the elements, and having a big degree of resistance to crushing is a good material where heavy loads must be carried. Porous hollow tile are made by mixing sawdust with the plastic clay. The sawdust is destroyed by the intense heat of the kiln, leaving the finished product full of little cells like those of a sponge.

Semi-porous hollow tile are made by mixing a certain percentage of finely pulverized coal with the plastic clay. This coal burns out during the process of firing leaving the blocks of a porous texture just the same as when sawdust is used.

We will have more to do with porous and semi-porous tile in connection with the subject of fireproofing. Owing to the cells they contain, they will absorb a large amount of water so are not suitable for exposed places, particularly in cold climates, as the alternate wetting and freezing would soon destroy the material. These grades are at their best when used for the interior of buildings. Owing to a certain flexibility which they possess, they will not fail, even under severe abuse. Semi-porous and porous tile will not crack or break from unequal heating, or from being suddenly drenched with cold water when in a heated condition. Owing to their porous texture, nails and screws can be driven into them so that they are very suitable materials for interior partitions as trim can be nailed or otherwise fastened direct to the tiling. Then, too, they are easily worked and can be cut with an ordinary carpenter's saw or other edge tool.

(To Be Continued)

A Combined Fence Post and Mail Box

By Albert Marple

THIS unique feature is made entirely of concrete and is solid. It is about five feet in height, two and a half feet in diameter at the base and two feet at the top. During the construction work an opening a foot in height and eight inches in width was left a short distance from the top of the post, this extending entirely through the concrete work. The mail may be placed within the "box" by the postman from the front sidewalk and removed by the owner of the place without his having to leave the yard. The pier serves also as a post to which one side of the ornamental gate is hung. As have all of the other similar posts around the property, this pier has been given an uneven "plaster" finish.

Construction of Substantial Form for Concrete Curb and Gutter

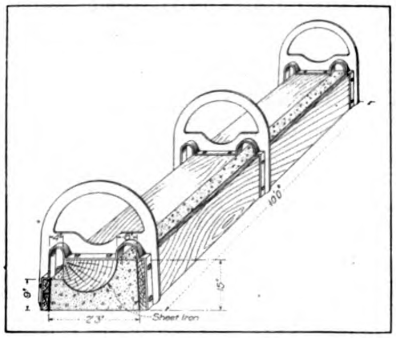
By Ernest Drah

WHERE considerable concrete curb and gutter work is to be done, a form that is lasting and convenient will prove an asset of economical value. The form shown in the accompanying illustration is of such substantial nature as to readily permit of its being used over and over again.

The sides of the form are built of 2 in. planks. The lower or street plank is 9 in. wide and the curb or sidewalk side is 15 in. wide. A center timber is shaped to conform with the desired shape of the gutter. These timbers are faced with sheet iron, which gives a smooth surface to the concrete and adds durability to the form. The plank and central timber are bolted to cast iron frames spaced 5 ft. on centers. The frames are flanged so as to be readily bolted to the wooden members. The planks forming the side of the form have a slight batter so that the forms can readily be taken up from the concrete.

Each form is 10 ft. long, so that three cast iron frames are required.

The concrete is placed into the forms at either side of the central timber, being well tamped. If a wet mix is used and there is a tendency for the concrete to flow out through the lower or street side of the forms, a board can be placed the length of this side of the form, thus effectually preventing oozing out of the concrete. The street side of the forms is fastened with iron spikes driven into the ground and spaced about 4 ft. apart. These spikes prevent the possibility of the form moving while the concrete is being stamped.



The holes in the cast iron frames permit of ease in handling the form.

When the form is lifted up, the concrete can be trowelled to removed any roughness that may be present. The curb and gutter may be finished with either neat cement mortar or with a 1:2 mix of mortar. This smoothing or finishing can be done rapidly as it requires no special skill.

Several forms can be used, which permit working straight ahead until the first section laid has set enough for the form to be lifted and this form is then taken to the continuation of the gutter. Thus no time need be lost.

System of Ventilation for Concrete Barns

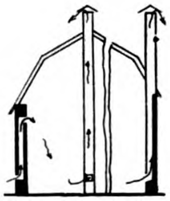


Fig. 1—Two Methods of Installing Ventilating System

Fig. 2—How the Ventilating System Can Be Used on a Concrete Barn

CONTRACTORS who are considering the erection of concrete dairy barns often hear advanced the objection that concrete buildings are damp and that moisture is found on the inside surfaces of the walls.

This trouble in a concrete (or any masonry) barn is due to lack of ventilation and is not caused by moisture penetrating from the outside. The amount of moisture exhaled by a cow or horse is very large and when a considerable number of animals are confined in one room, the aggregate amount of moisture is astonishing.

This exhaled moisture, when not removed by a ventilating system, condenses into water when it comes in contact with the cool walls of the barn. Since this condensation is not apparent in a wood barn, the owner is blissfully unaware that ventilation, by the removal of moist foul air, would add materially to the health of his cattle.

Probably the most generally used system of ventilation for barns is that originated by Prof. F. H. King, Madison, Wis. This is well adapted to concrete barns and gives excellent results.

An examination of Figs. 1 and 2 will show the location of these air passages. It will be apparent that the fresh air enters the barn near the level of the ceiling, thus having an opportunity to become warmed before being breathed by the animals. The exhaled moist air laden with CO_2 is conducted out through openings situated near the floor level.

By having the inlet and outlet openings at different levels draughts are avoided and fresh air is distributed uniformly.

It has been found that the amount of air required by animals is as follows: Horses, 70 cu. ft. per min. for each one; cows, 60 cu. ft., and sheep, 15 cu. ft. Air passes through the ducts at a velocity of 300 ft. per min. By using these figures the size of the duct can readily be determined. For example: The barn is to have space for 10 horses and 70 cows:

10 × 70 cu. ft. = 700 cu. ft. of air
70 × 60 cu. ft. = 4,200 cu. ft. of air
Total....... 4,900 cu. ft. of air

The total area of inlet air passages =

$$\frac{4,900}{300} = 16 \text{ sq. ft.}$$

Hence, there should be provided eight inlet ducts 1 ft. x 2 ft. and the same number and size of outlet passages. A less number of each may be provided by enlarging the size, but it is not best to make them too few, since the distribution of air would not be so nearly uniform.

In concrete barns the ducts may be conveniently located in the walls by using sheet iron flues or chimney flue tile, and casting the concrete around them. The inside of the air passage should be as smooth as possible, in order to prevent

the accumulation of dust and to make easy the passage of air.

Another method of constructing these passages is to use stucco on wood or metal lath. In this case the inside is lined with sheet metal, nailed to the upright wooden studs and the stucco applied on the lath nailed to the outside faces of the studs.

For regulating the amount of air, sliding wooden shutters pass over the duct openings. With ventilating systems it is sometimes necessary to supply artificial heat to the barn. This may seem an unnecessary expense, but the slight added cost is more than compensated for by the improved health of the animals when supplied with pure air at an even temperature. The heat maintained need not be high—never over 55 deg. F.—*Alpha Aids.*

How to Build a Dry Cellar

By W. N. Hathaway

TWO houses that I built cellars for last year were surrounded by water for some time last spring, but were entirely dry.

My method is to lay two-cell building tile 5 in. x 8 in., set up edgeways around the outside of footing, making them the form and a part of the footing, and giving plenty of fall into the top of sewer, which should be at least 2 in. below the bottom of the footing.

I use these instead of round drain tile, first, because they make a better footing, and, second, because they have two openings to make drainage doubly sure.

A great deal of time and extra expense is wasted in building forms for the common house cellar. I have found that one can use the lumber intended for the roof for the forms with very little waste.

I line up the cellar and see that it is dug square and true. Our soil is all clay, so we do not have to double form, but use the bank for one side. If the building is heavy enough to require more than a 14-in. or 16-in. footing. I dig out for the base and lay the square tile as mentioned and place concrete for footing.

For a cottage or light houses I lay down studs on the cellar bottom about 2 ft. apart, and board one entire side on the ground, placing a 1-in. piece under studding for a sill, then raise this form and set it about 3 in. above the cellar bottom. I place a joist or any heavy lumber around the cellar against the forms; I stake it down well about every 4 ft.; this will allow the concrete to run under the forms and make a footing.

Now for center bracing—and this is very important—use joist edgeways all around the building, about ground level, and brace well with joists if you have them. Stake well.

If there is a cistern in one corner, build the inside form first and put some brick next to the ground for spreaders, and brace well, so as not to use wire ties. I used to use wire ties and they made more or less trouble from leaking. Raise the center form and let the concrete run under for the bottom. After forms are removed, place a top coat on cistern bottom, and waterproof at once. Use 6d. or 7d. nails, and as few as will do.

To finish outside above ground I earth-fill to the ground level, if high walls are required, but if block are used above grade place forms level at each corner and line up with nails every two or three feet, set in inside form. To fill the forms have gravel near one end of the job, so the mixer will just go between it and the wall, and place as much as you can at that place, then move to the next corner, and fill as much as possible, after which use wheelbarrows. When circumstances permit I run the cellar floor as soon as forms are out.—*Concrete.*

A New Fireplace Feature Introduced in California

By Albert Marple

THE double fireplace is probably the latest feature to make its appearance in Southern California. In that section novel forms of chimneys, pillars, etc., have made their appearance in the past, but this new idea is considered the "limit."

This feature is constructed so that there is a fireplace on both sides of the chimney, both inside and outside of the home, these being identical with the exception of the outside fireplace being left rough, while the one inside the home is finished to harmonize with its surroundings. This novel feature enables the home owner to enjoy the log fire within the home on cold winter evenings. On the other hand, when the days get warmer and the open air of the balmy evenings is appealing, the fire may be started in the outdoor fireplace, about the front of which the chairs or benches may be arranged.

This unique double chimney idea originated with some of the mountain cabin owners who own summer homes in the Arroyo Seco, located just west of Pasadena. Since the first of these features made its appearance several months ago, the idea has taken like "wildfire," and already a number of additional ones have been constructed. This canyon, however, could not hold this original and valuable idea, this being shown by the fact that quite recently a resident of Santa Monica included one of these "double" features in the construction of his city residence.

While this feature is double, the fireplaces are at the same time separate. That is, each has its separate flue and firebox, there being a partition varying in thickness between the two fireplaces.

Keeping Reinforcing Bars in Position While Concreting

Some Practical Hints on Getting the Most Strength Out of the Reinforcement

By A. M. Wolf, C. E.

A MATTER which is too often slighted in reinforced concrete structures is the holding of the reinforcement in the proper position while the concrete is being placed so as to insure a finished structure in accordance with the design. The concrete members are carefully computed with the steel definitely located, but unless the bars occupy that position in the finished structure, the strength of the same will be a doubtful quantity. The labors of the best designer and detailer can be easily set at naught by the carelessness of those in charge of the construction while placing steel and concrete.

Such facts as these must be taken into account by the designer, and provision should be made as far as possible to make the design "fool-proof." It is, of course, impossible to make anything that will pass this "acid test," but many times notes and suggestions regarding construction, placed on drawings, even though they appear unnecessary, aid the inspector and constructor in obtaining a more nearly correct finished product.

Very often much time is spent in carefully designing and detailing the reinforcement for a building or other structure, and the all-important matter of getting and keeping the steel in correct position is disposed of by a simple note such as the following: "All reinforcement to be bent and placed, as shown on plans, and to be securely fastened or tied with wire ties to prevent displacement during the pouring of concrete and to insure proper position of reinforcement in the finished structure."

In such cases, it is left entirely to the discretion of the construction foreman to devise a means of keeping the bars in position. This, incidentally, adds to the troubles of the inspector who has enough other matters to occupy his time without having the added duty of a continual fight with the contractor about keeping bars in position. The strength of a concrete structure may, therefore, depend almost entirely on the foreman's knowledge or ability, rather than on that of the designer. If the bars are placed too near the surface, the fireproof qualities of the structure are impaired. If placed closer to the neutral axis than assumed in design the strength will be decreased rapidly, since the resistance coefficient of the member is the quotient obtained by dividing the bending moment by the breadth times the effective depth squared.

In the early days of the use of reinforced concrete, no special means of holding bars in position were employed. Sometimes an inch or so of concrete was placed, the bars laid on this and the remainder of the concrete poured. Then, again, the upper portions of bent bars were supported on blocks of wood which were removed, or rather intended to be removed, after nearly all the concrete was in place. In many cases these were forgotten and left in the concrete. Another practice which is still current in many districts is to place the reinforcement directly on the forms and start pouring concrete. After an inch or more is poured the bars are raised an indefinite amount by a common laborer armed with a hooked bar made for this purpose.

Anyone can readily see that all of the above mentioned methods are nothing more than makeshifts and deserve only condemnation. Where such shiftless methods are used, the actual position of the bars is very likely to be much different than that assumed by the designer and the strength of the structure is more or less of a "gamble."

This is neither good practice nor economy. The method and means of supporting the reinforcing bars should be clearly indicated on plans, these details being just as important as the proper location of the bends of bars and stirrups. Where bars are bent up into the tops of slabs and beams they can be best supported by cross bars of relatively small size resting on concrete blocks of a height to insure the exact location of bars. Bars in the bottoms of slabs can be kept at the proper height by small Z-shaped metal clips and spacing bars, to which the reinforcing bars are wired.

Where reinforced concrete columns with spiral hooping are used it is essential the spiral be held rigidly from end to end so as to have the pitch of same uniform. This is easily done by the use of continuous spacers (of which there are various kinds) attached to the spirals at the time of fabrication. Three such spacers are sufficient for spirals of small core diameter (say up to 24 in. dia.), while for larger columns the spirals should have four spacers. The old practice of wiring the spiral at intervals to two or more of the longitudinal bars requires very rigid inspection to insure a good job, and even then there is great danger of the spirals being spread apart or misplaced while concreting the column. When the spirals are kept in shape by continuous spacers, they can be used as a form to wire the longitudinal bars to at the proper spacing, thereby making the entire column reinforcement a unit and eliminating the danger of the steel becoming misplaced while the concrete is poured. The entire reinforcing unit for

Reinforcement for One Floor of Illinois Wall Paper Mills. Note that Reinforcement is in Two Layers only over Column Heads, Giving Maximum Efficiency and Permitting Proper Placing of Concrete in Columns and Column Heads. Bars Held in Correct Position by Concrete Blocks

the column should then be wired to the forms in such a way as to keep the outside covering of concrete as near uniform as possible.

Before a concrete structure can be properly erected, someone must devise a means for holding bars in position during construction, and as a general rule a good designer is more capable of handling these details satisfactorily and to good advantage than anyone else. If such detail work is left to the contractor, the owners, if the contractor is a careful bidder, pay very dearly for this "designing service." In many cases it is very poor; on the other hand, if the contractor is not wide-awake, he pays the bills. This, it can readily be seen, is neither fair nor economical, and is sure to add to the frequent occurrence of "wild" and "unbalanced" bids, especially on large contracts.

If the architect and engineer expect the contractors to bid intelligently and desire to have all contractors enter their bids on the same basis, it is imperative that these details be shown on the general plans, when the work is at all complicated or important. The double purpose of keeping the reinforcing bars in the proper position and the obtaining of more balanced and uniform bids, is at once fulfilled by showing these details for supporting bars on both the general and detail plans. For this reason the practice should be encouraged and should be more in evidence than in the past.

The illustration shown herewith gives the reader an idea of how much more workmanlike and finished the reinforcement for a reinforced concrete floor looks when the bars are supported at regular intervals rather than by "hit" or "miss" methods. In flat slab construction it is highly imperative that bars be kept in the proper position, namely, in the top of slab around column heads in the regions of negative moment and in the bottom of the slab at points between columns where the tension occurs in the bottom of the slab. The accompanying illustration shows the reinforcement for a flat slab floor of the Akme System type as designed by the Condron Company, structural engineers, Chicago, held rigidly in place, ready for concrete. (The reinforcement for an entire floor, 364 ft. by 127 ft., is shown.) This indicates quite clearly how this can be done for the portion where bars are in top of slab, by using previously moulded concrete blocks, upon which the supporting bars for the reinforcement in top of slab are laid. Bars in the bottom of the slab are held up from the forms by occasional Z-shaped clips or chains of steel, the bars being wired to transverse spacing bars.

When such methods are used the architect, engineer and owner can rest assured, other conditions being properly attended to, that the strength of a structure is more nearly in accordance with that computed than if the bars are blocked up temporarily on wood blocks which are removed as concreting progresses.

What Important Factors Does Strong Brickwork Depend On?

By Alfred B. Searle

THERE is a common idea among builders and others that the strongest bricks are the best. This is often a mistake, for strength alone (provided it is sufficient) is of little value in judging the value of various bricks.

What is more important still is the fact that the strength of brickwork has very little relation to the strength of the bricks used in its construction. For instance, the average crushing strength of a number of bricks, each tested separately, may easily be fifteen or twenty times the strength of the same bricks when built into a pier or wall. The reduction in strength does not occur in the bricks themselves, but is due to the mortar, as the mortar is never so strong as the bricks which it unites into a solid structure.

The testing of brickwork is a costly and difficult matter, and is not always satisfactory so far as results are concerned. Moreover, the shape of the structure makes a difference in the strength, and a square pillar gives different results to a part of a nine-inch wall of the same cross-sectional area.

Among some of the most valuable tests of the strength of brickwork are those made by the American Bureau of Standards at Pittsburgh, Pa. They were made on pillars 30 in. square and 10 ft. (or forty-four courses) high, the mortar joints being 5/16 in. thick. The highest strengths were obtained with bricks laid in cement-sand mortar, the next best were bricks laid in cement-lime mortar, and bricks laid in common lime mortar gave only half the strength of bricks laid in cement-sand mortar.

The age of the mortar before it was used had an important increase on the strength of the brickwork, freshly made mortar not being nearly so strong as that which had been stored for several weeks. This confirms the general opinion that it is a mistake to use fresh mortar for buildings of importance and great height.

The greater strength of brickwork laid in cement appears to be due to the fact that the cement merely requires water to make a hard and fully set material, whilst lime-mortar requires carbon dioxide from the air. As the mortar hardens on the surface it becomes increasingly difficult for the carbon dioxide to penetrate it, and the weakness of brickwork laid in lime-mortar may therefore be attributed to insufficient carbonation of the mortar.

For this reason, engineering bricks and others of an impervious character should be laid in cement-sand mortar, for such bricks do not offer the facilities for the penetration of the air to the extent which is possible with porous bricks.

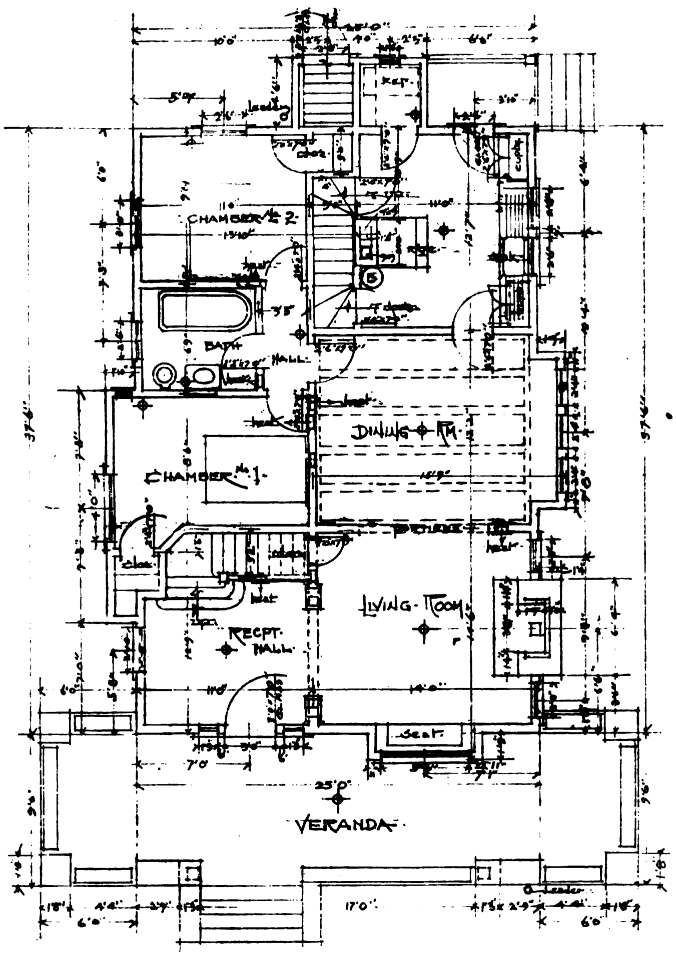
In testing brickwork one of the most impressive features is the curious manner in which cracks appear. A considerable time before the total crushing load is reached, the sound of cracking is heard and an examination of the brickwork shows slight, hairlike cracks. These cracks are largely due to the irregular bearing of the bricks on the mortar, and they show the necessity for using mortar of suitable consistency; mortar which is too stiff will not let the bricks bed sufficiently, whilst too soft a mortar will squeeze out and so form a defective bedding, though of the two evils too soft a mortar is the lesser.

Tests have shown that the bonding has only a small effect on the crushing strength of brickwork, and that its chief value lies in the resistance it affords to side thrusts and to the internal strains during the drying of the structure. They also showed that the thicker the bricks the greater the strength of the brickwork, owing to the modulus of rupture being increased by this means. The practice of using 3-in. bricks in the North and Midlands is, therefore, preferable to the thinner bricks customary in the South.

Tests also show that bricks laid on edge are stronger than those laid in the usual manner, so that even thicker bricks —up to 4½ in. thick—may be better than those generally used, so far as vertical strength is concerned; whether they would be better for side pressures and internal strains is another matter on which at present there is no information.

The tests show most emphatically that care taken in making the mortar, in aging it, and in laying the bricks is labor well spent, and that it has the greatest possible influence in producing a strong structure. Once again, therefore, we learn that sound and honest workmanship is one of the chief factors in reliable brickwork.—*Building World.*

An Attractive Home of Bungalow Type

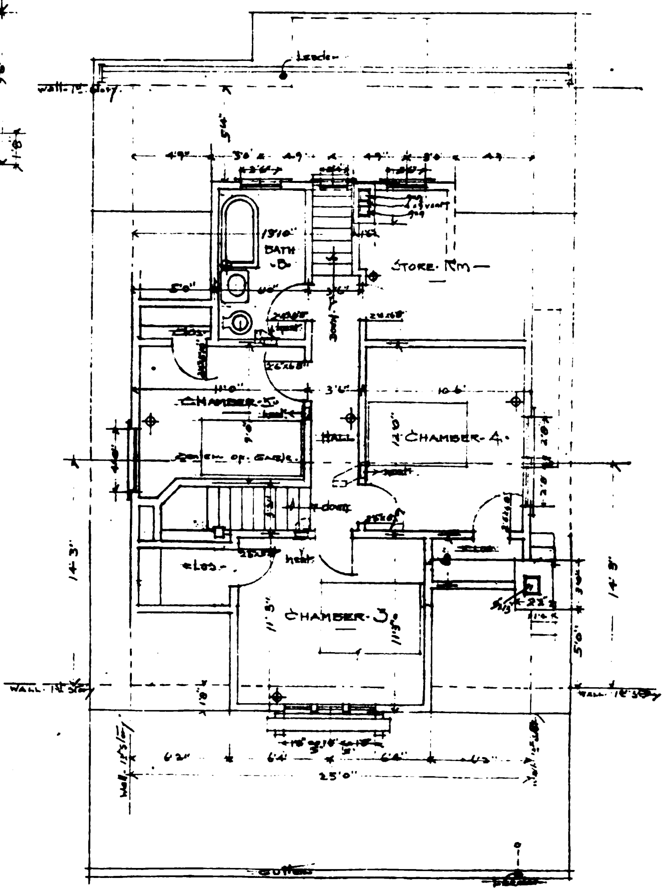


Plan of First Floor. Scale 3/32" = 1 ft.

A MODIFIED bungalow type of dwelling has become extremely popular in the eastern part of the country. Long, sweeping roof lines are the characteristic of this type of house, which is termed "bungalow" whether or not it has a second story.

The bungalow shown on the accompanying colored insert is an excellent example of this popular eastern type. Field stone foundation walls and chimney, together with the exterior coating of stucco, afford an attractive combination for the main section of the house.

Well placed lattice on various portions



Plan of Second Floor. Scale 3/32" = 1 ft.

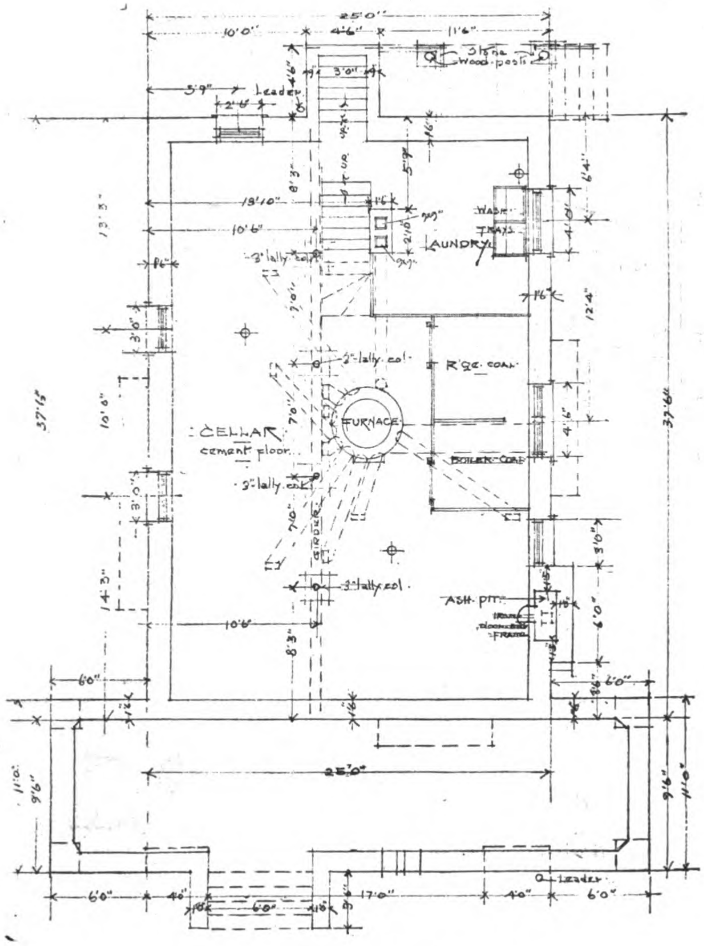
of the house give an interesting accent to some of its features.

From the porch entrance is had into a reception hall, which communicates with the living room through a cased opening. The main feature of the living room is a large fireplace built of field stone. A seat is placed in the living room bay.

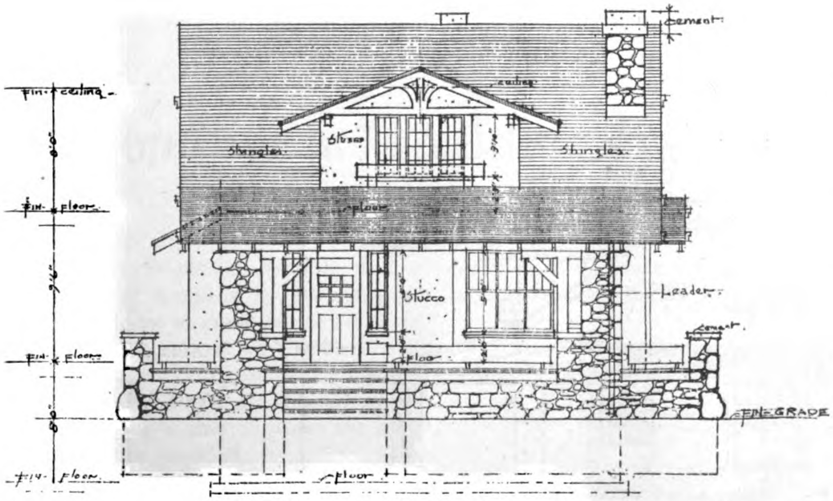
The living room and dining room are semi-separated by a cased opening, from which are hung portieres. The dining room has a large bay and a beamed ceiling.

The dining room communicates directly with the kitchen, there being no pantry. The sink is placed under the windows, thus affording plenty of light thereon. At the extreme left of the sink is placed a handy cupboard. A refrigerator is placed in a small room and can be iced from the outside. The kitchen opens directly upon a small porch.

Two bed rooms and a bath room complete the layout of the first floor. Indeed, almost any house with bed rooms on the first floor is in the East called a bungalow, and this is one of the characteristic features of this type of design in the East.



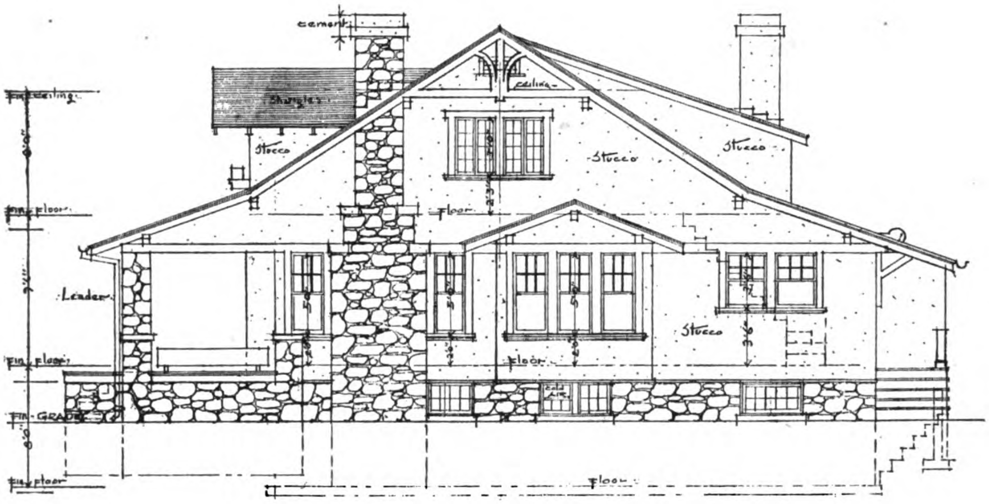
Basement Plan. Scale 3/32" = 1 ft.



Front Elevation. Scale 3/32" = 1 ft.

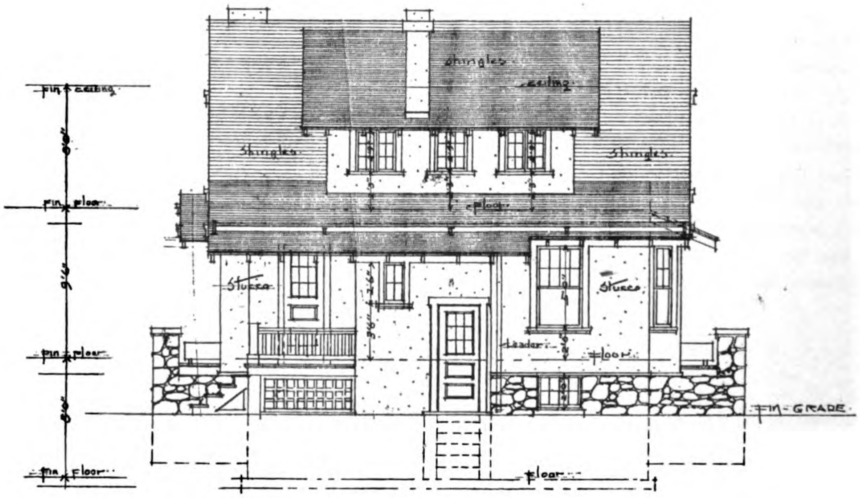
A hall runs along the center of the second story, there being three bed rooms, a bath room and a store room. Plenty of closet space is provided. The house is lighted by electricity and is heated by a warm air furnace.

This residence is located in Larchmont Gardens, N. Y., and was constructed for the Clifford B. Harmon Co., New York City, in accordance with plans and specifications prepared by W. S. Moore, architect, 30 East Forty-second Street, New York City.



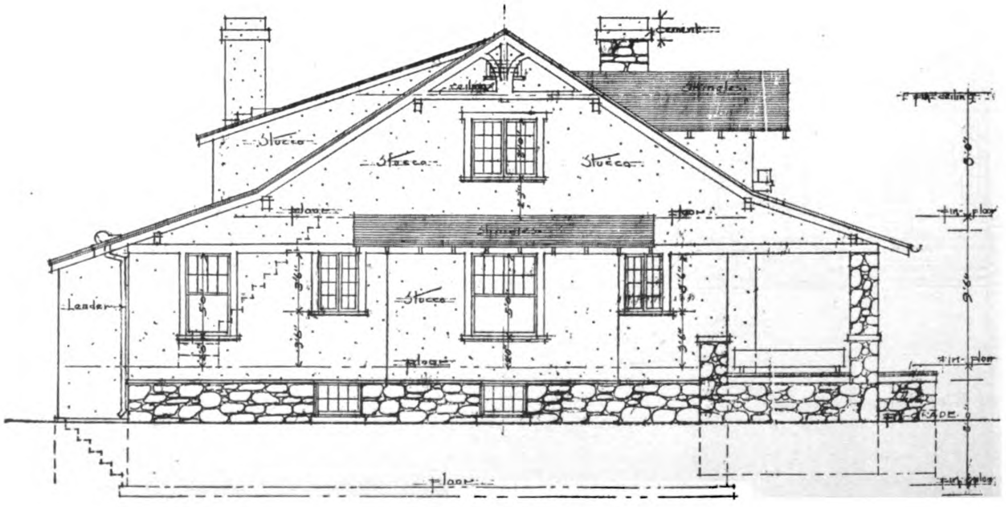
Side Elevation.

Scale 3/32″ = 1 ft.



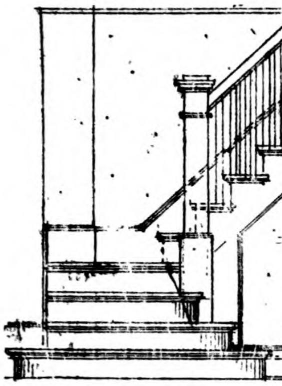
Rear Elevation.

Scale 3/32″ = 1 ft.



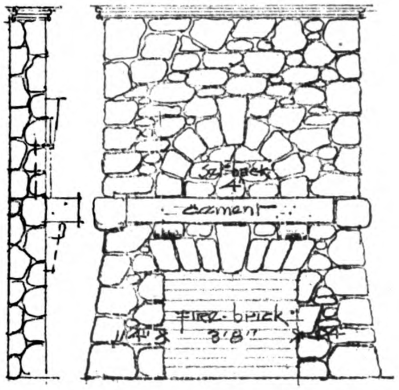
Side Elevation.

Scale 3/32″ = 1 ft.

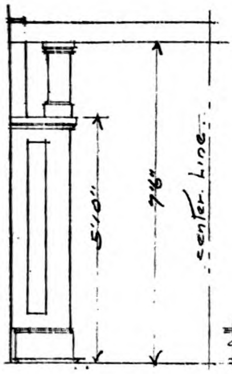


Elevation of Stairs.
Scale ¼″ = 1 ft.

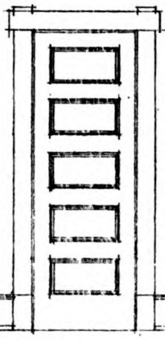
End Paneling of
Dining Room.
Scale ¼″ = 1 ft.



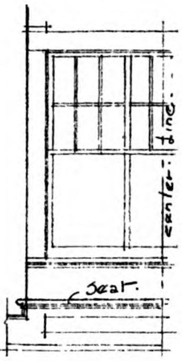
Section and Elevation of
Living Room Fireplace.
Scale ¼″ = 1 ft.



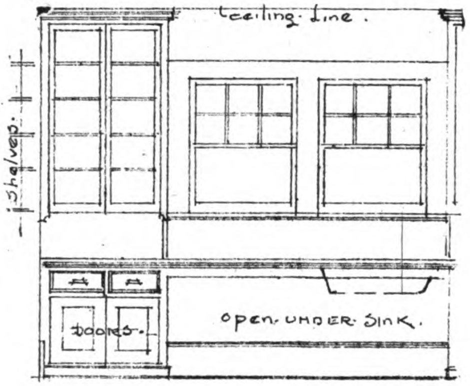
Cased Opening from
Hall to Living Room.
Scale ¼″ = 1 ft.



Typical Door
and Trim.
Scale ¼″ = 1 ft.



Elevation of
Front Window
in Living Room,
Showing
Trim and Seat.
Scale ¼″ = 1 ft.



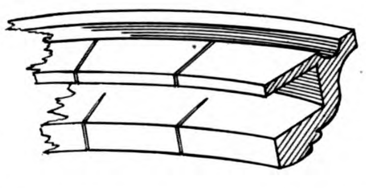
Cupboard and Sink in Kitchen.
Scale ¼″ = 1 ft.

Bending a Moulding by Plowing and Kerfing

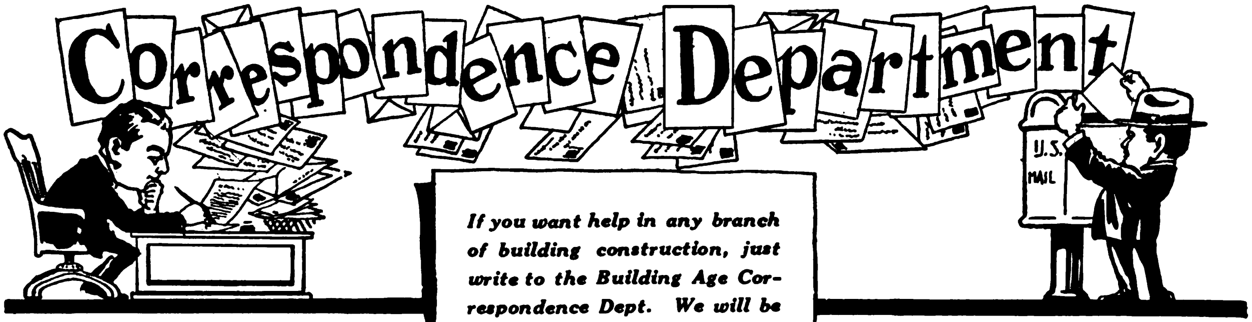
By Henry Simon

It quite frequently happens that a piece of moulding must be adapted to a bulge or curve not to be found in the plans, but yet very much in evidence as a result of careless framing or plastering. This is not difficult where the moulding is thin or where the back edge may be taken off.

Very often, however, neither is the case, as, for example, in heavy picture moulds which are only supported against the wall but not against the ceiling. To take the back off such a moulding would be to make it impossible to properly fasten it at all, since the nailing would have to be done entirely along the weak bottom edge, for there would be nothing to brace it against nails placed higher up.



Under such circumstances a remedy which readily solves the difficulty is to plow out the heavy back of the moulding, leaving a ridge ¼ in. or so standing at the top to serve for bracing purposes. If necessary this ridge and the bottom back edge below it may be cross-cut at intervals of a few inches so as to destroy the resistance to bending of these parts while retaining their entire strength for bracing the moulding against the wall. The heaviest mouldings can in this manner be bent around almost any bulge encountered under actual conditions.



If you want help in any branch of building construction, just write to the Building Age Correspondence Dept. We will be glad to answer all your questions without charge.

Questions should be confined to construction only, as the editors cannot undertake to design structures.

All readers are invited to discuss the questions and answers published.

How Efflorescence Can Be Removed from Brickwork

From S. S., New York.—What causes the white coating or efflorescence on brickwork? Is there any method of removing it or preventing it?

Answer—Efflorescence is something which all of us have to contend with at some time or another when we use brick and cement in our construction and at times the appearance of a finished piece of brick masonry well done is anything but encouraging after every effort has been employed to obtain a satisfactory piece of work.

The efflorescence referred to in inquiring, I presume, is the white coating which at times makes its appearance on the face of brickwork after the work has been laid up for a short time; this much more quickly if the weather is wet or the walls subject to continued dampness.

Efflorescence is due primarily to the disposition of soluble matter in the mortar, which being dissolved in the mixing with water is deposited on the face of the wall in the evaporating or drying out process. It is also caused in some instances by salt in the clay from which the brick is manufactured.

The efflorescence deposits are generally sulphate of magnesia, carbonate or sulphate of soda, nitrate or carbonate of potash.

There is no way of preventing efflorescence except by making the face of the brickwork impervious to water and dampness or by using brick which are manufactured impervious.

Efflorescence can be readily remedied temporarily by using a weak solution of muriatic acid diluted with water. However, it will be found that within a short time the efflorescence will again appear after the walls have been subject to further dampness.

As a permanent remedy a wash of what is known as the sylvester process has proven very successful, same being very simple in its preparation and application. The sylvester process consists of two washes, the first being composed of castile soap and water in the proportion of ¾ lbs. of soap to a gallon of water, and the second, ⅛ lbs. of alum to a gallon of water. The soap wash should be applied boiling hot with a brush to clean and dry walls. The best time to apply this wash is after the walls have been washed with a diluted acid as heretofore described and after same have been thoroughly dried. The soap wash, after being applied, should be allowed to dry 24 hours before the alum wash, which can be applied cold, is put on. The alum wash is applied with a brush in the same manner as the soap wash. The coats are applied alternately two or three times, in most cases this being sufficient to obtain the desired result, as this makes the walls practically impervious.

Attention is also called to the fact that boiled linseed oil applied in two coats and after thoroughly dried washed over with a weak solution of ammonia has been used successfully, but the sylvester process is recommended.

All cements are likely to cause efflorescence. This may be partly or entirely avoided by using white Portland cement, LaFarge or other non-staining cement mixed with sand in the proportion of one to two, it being necessary that the sand be reasonably clean.—W. G.

How to Find the Proper Size Wood Beams

From C. S. C., Architect, Mass.—The article in your helpful paper, issue of March, 1918, entitled "How to Find the Proper Size Wood Beams," has interested me very much. I have always been interested if not a little disturbed by disagreement of tables from different sources, but I think I never met a table before that permitted such light construction as does Table I in this article.

It is stated in this article that "these tables can be used without hesitancy in the best practice * * *" Is that true? I would never think of using 2 in. x 8 in. spruce joists for a span as great as 14 ft. 8 in., spaced 16 in. o.c. No doubt the floor would be "safe" as far as collapse is concerned, but it would not have the stiffness desired even in medium class work, would it?

I note inconsistencies between Table I and Table III, the latter seeming to be much more conservative. The tables are, the author says, for the ordinary carpenter or building contractor who does not know how to accurately figure the strength of wooden beams. Should there not be at least a warning that these tables are not sufficient for floors with plastered ceilings below? Or am I extravagant in my ideas?

Answer from W. A. Giesen, Architect, New York.—Table No. 1, as published, I agree, does permit of light construction, but you must admit the load imposed upon the 2 in. x 8 in. beam in question is also light, being a total of only 60 lbs. per superficial foot, 20 lbs. of which is dead load or weight of construction.

Should plaster partitions be imposed upon the span given an additional dead load must be taken into consideration, and, under certain conditions, concentrated loads.

I have used tables similar to these for years with satisfactory results and have never had any trouble in regard to a lack of stiffness. Bridging and underflooring also finished flooring give the joist additional stiffness so that as a matter of fact and common sense this must be taken into consideration.

You state that you would never think of using 2 in. x 8 in. spruce joists for a span of 14 ft. 6 in. spaced 16 in. on centers—and that they would not have the desired stiffness. I have used 2 in. x 8 in. joist on that span spaced 16 in. on centers in some first class work and did not regret it.

You further state you noted inconsistencies between Tables I and III, the latter seeming to be much more conservative. I do not understand how Table III can be more conservative, as Table I was calculated from Table III.

The Science of Handrailing

James Bruce, Wanganui, New Zealand.—I read Mr. Stark's article on the "Science of Handrailing" in the December Number of the Building Age with the greatest pleasure and interest. Will Mr. Stark please accept my appreciation of his work which adds to our knowledge

of this interesting branch of applied geometry? Your handrailing readers must, like myself, be grateful to Mr. Stark for his articles, which are most interesting and instructive. The finding of the point x in Fig. 1 is very neat and I can follow the proof of solution quite clearly.

The finding of the point v in Figs. 6 and 8 is something quite new to me, and I will in the future use it whenever I have occasion, as it is a very accurate and expeditious method of carefully planning the minor axis for the system I work on. I hope Mr. Stark will find time to give us his system dealing with the cases where the plan of the rail is greater or less than a quadrant.

Concrete Footings for Steel Columns

From J. E. W., New York.—Will you kindly enlighten me on the following matters of construction through the columns of your valuable magazine, of which I am a subscriber?

What is the usual amount of grout placed under steel or cast iron column bases when setting on concrete footings?

Should cast iron bases be provided with holes for pouring grout?

What mix of concrete is preferable? (I have both reinforced and plain concrete footings.)

The above information will be greatly appreciated.

Answer. — Concrete footings when poured to receive steel or cast iron columns should be brought to within three-quarters inch of the level at which the column bases are to be set.

It is a good plan to build the forms to within one-half inch of the level at which the bases are to be set as a small shrinkage in the drying-out of the concrete usually takes place; this shrinkage ordinarily is about one-eighth inch.

Grout under bases should be three-quarters inch in thickness, it not being advisable to make it much more and never any less.

The best grout is mixed of pure Portland cement, although some advocate mixing it in the proportion of one part Portland cement and one part clean sharp sand. In any event it should be thoroughly mixed to the consistency of a thick cream before being used.

The usual method is to wedge up the steel or cast iron bases from the concrete footings to their proper levels with hard wood wedges. A course of brick is then laid around the edge of the footing and around the column base forming, as it were, a pan into which the grout is then poured. After the grout has hardened from about eighteen to twenty-four hours the bricks are removed and the wedges withdrawn, the space from which the wedges were withdrawn being filled with cement and sand mixed in equal proportions.

Cast iron bases should always be provided with holes cast into same, as in the pouring of the grout it flushes up through these holes, and there is absolutely no possibility of air pockets forming under the base in the grout which, if they existed, would not give it a solid and uniform bearing.

The most desirable mix of concrete is one part Portland cement, two parts clean, sharp sand and four parts of broken stone or washed gravel Course aggregate of stone or gravel should be of a size not larger than that which will pass through a two-inch ring. For reinforced concrete the course aggregate should never be any larger than that of a size that will pass through an inch-and-one-quarter ring.

In the pouring of concrete it is advisable to use what is termed as a wet mix, as with this sort of mix and adequate spading at the forms the course aggregate is worked back of the face and consequently a smooth finish will result.—W. G.

How the War Has Affected the Building Trades in Indiana

Conditions Which Lessened Activity Has Brought About Are Called to the Attention of McAdoo and Members of Congress

By a Committee from Indiana

WAR conditions in the building trades and the importance of increased building activity were emphasized on March 7 by a conference between the Indiana Congressional Delegation and a committee from Bedford, Ind. This committee presented the following details regarding conditions in the building trades in Lawrence and Monroe counties:

Monroe and Lawrence counties had exceeded by a generous margin in each instance their allotments of Liberty loans, Y. M. C. A., Red Cross and other war fund contributions, not to mention man power furnished.

It was emphasized that the Indiana limestone industry is the mainstay of both these communities, involving, as it does, an investment aggregating well in excess of $10,000,000, employing normally something like 5000 men, with shipments nation wide and ranging from 20,000 to 30,000 carloads annually.

The industry is already depressed below 25 per cent of normal with not over 1000 men now at work, where the full complement of 5000 would ordinarily be on the payrolls at this time of the year. The condition was outlined under which the district has always in the past emerged from the winter's interruption into spring operations. That is, the companies invest large sums in stocks in raw material, depending on early spring business for the conversion of these into cash. The men depend largely on credit extended them by merchants to carry them through the usually brief period of idleness. As matters stand, the raw material remains stock on hand and store credit for the men has been canceled. Many competent employees who never knew unemployment have not earned one cent so far this year. Numerous families already are dependent on charity. Individual instances of destitution and want are cited.

It was freely admitted that quite a number of men had left the district and found employment elsewhere, but nevertheless a large contingent remains in its home cities for various reasons. Some spent precious money to find work elsewhere but were unsuccessful and returned; some found temporary employment only elsewhere and returned; a good many had not the wherewithal to travel, so perforce stayed home, hoping against hope for an opportunity to make a living.

Why Labor in Building Trades Is Not Mobile

It was argued that labor is mobile to a degree only, and that an artisan skilled

in one line mastered in 20 or 30 years effort cannot quickly, if at all, become proficient in an entirely new craft.

Some discussion was had on the present general policy of discouraging all commercial building operations. The committee made it clear that it did not expect normal activity, but did believe industry should be permitted to live so long as it does not interfere with war matters, and that in fact some industrial life is necessary with its production of new wealth, thus enabling important communities to contribute properly to war financing.

It was submitted for the consideration of those present that the war cannot be successfully financed out of the wealth created in the past, but that continued production must furnish constantly increasing wealth, lest our tremendous expenditures out-run the available supply of old capital.

Not one of those present expressed disagreement with the arguments offered, but rather there was manifested a unanimous disposition to help influence the situation so as to maintain public welfare at a stable level and thus instill in the people confidence, and give them the power to help win the war.

It was mentioned that it is the purpose shortly to call a meeting of associations interested in building materials of national importance, for the purpose of crystallizing the practically universal sentiment that to the extent that it does not interfere with war purposes, the industrial life of the nation must go forward, producing wealth wherewith to furnish the sinews of war.

A Delegation Meets Secretary McAdoo

The meeting lasted one and one-half hours, and as a result an interview with Secretary McAdoo was arranged through the courtesy of Representative Dixon. A delegation consisting of Senator Watson, Representatives Cox and Bland and the Bedford committee met Secretary McAdoo on March 11.

After brief introductory generalities, a thorough presentation was made to the secretary of the motive responsible for this demand on his most valuable time. The burden of the argument was placed on the premise of public welfare, and its present status not only in southern Indiana, but in many other localities as well. Special emphasis was laid on the circumstances that the delegation was not interested primarily in the material well being of a particular industry or actuated by a desire to have purely business bolstered up, but decidedly that it had at heart the distress and actual, constantly increasing destitution of innocent citizens who are helpless and offer a grave problem in an already perplexing situation.

Thousands of Unemployed

Mr. McAdoo stated he was not aware of the existence of idle labor, and that in shipyards, railroad repair shops and many other places there is a keen dearth of labor.

Statements related to those previously made to the Indiana Congressional delegation were offered in reply, as also that in the city of Chicago over 50,000 men are said to be idle in the building crafts. That the president of the National Carpenters' Union had only a few days before reported tens of thousands of his men out of work, and reference was had further to 50 or more telegrams from all sections of the United States, indicating a surplus of labor in numerous widely scattered communities. It appearing that only in isolated districts where war contracts are placed in liberal volume does there exist an actual shortage of labor and an air of prosperity.

The Great Importance of the Building Trades

It was submitted to Mr. McAdoo that the building industry involves an annual wealth producing turnover of $2,000,000,000, employing directly an average of 1,500,000 men, earning probably $6,000,000 daily, and that no nation can weather successfully the sudden almost total extinction of such a vital and supremely important factor of its industrial establishment.

The point was forcefully presented that priority is the proper policy as already applied almost everywhere, except to the construction of buildings, and that no single but one of the most important commercial arteries, as a non-essential, is inconsistent, if not ruinous.

McAdoo Says "Poise of Industry to Be Maintained"

There was incidental reference to the activities of the Capital Issues Committee of the Federal Reserve Board. Mr. McAdoo emphasized that the duties of that committee are purely of an advisory nature, that there is nothing compulsory in its pronouncements, that nothing had been prohibited, and that it is his desire and that of the Government to "Maintain the Poise of Industry."

To this reply was made that clearly then the secretary had previously been misunderstood.

It developed in the course of the conference that the only specific reference to undesirable building operations at this time had been in connection with homes. The need of new hospitals, mercantile structures, apartment houses, warehouses and many other housing facilities was brought out. There was evident the thought in the secretary's mind that steel is a prime requisite in building work generally, and steel being in pressing demand in other directions, new building undertakings should be discouraged for that reason. The committee sought to explain to the best of its ability that the building industry has already adjusted itself to the long prevailing shortage of steel, and that erection of almost any type of structure, except the very tallest, is readily possible with the use of but negligible quantities of steel.

Mr. McAdoo asked what he could do to make plain what has been in his mind. It was suggested to him that a clear-cut statement to the effect that the Government means to pursue a constructive policy would serve to dispel the fog of misapprehension.

The secretary replied that in the light of everything stated to the public on this subject in the past, and the apparent misunderstandings created, further utterances would only serve to thicken the fog.

Originally intended to consume a few minutes only, the conference lasted a full hour. The conviction was carried away that considerable misinterpretation is abroad in the situation, and while as a matter of course every iota of effort must be expended in the direction of completely successful financing and prosecution of the war, the Government recognizes as of material bearing on that consummation the necessity of continued community welfare and "Maintenance of Poise in Industry." R. M. Richter, for the committee.

Percentage of Increase in Building Costs for the Last Eight Years

By W. A. Giesen, Architect

After consulting all of the important periodicals and papers also builders, carpenters and general contractors, I have arrived at what I believe to be an accurate estimate in per cent of the increased cost of dwelling construction for each year from 1909 to 1917. The increases are as follows:

1910.... 2 per cent more than 1909
1911.... 2 per cent more than 1910
1912.... 2 per cent more than 1911
1913.... 2 per cent more than 1912
1914.... 5 per cent more than 1913
1915.... 1 per cent more than 1914
1916.... 7 per cent more than 1915
1917....12 per cent more than 1916

This gives a total increase of 33 per cent.

The causes of this increase have been due to advances in wages as well as increases in the price of raw materials used in the manufacture of the various building products.

Handy Tables Showing Safe Loads of Wood Columns

By W. A. Giesen, Architect

IT is of most importance that wood columns when used in construction be of a sufficient size; in fact, more so than any other part of the various supporting members entering into work.

In order that those engaged in construction work may know what size would cover a certain requirement two tables giving the loads which can be safely imposed on posts of various sizes and lengths are given herewith.

Before giving an explanation as to the method of using the tables, a few words of advice will be given about wood columns which should prove of interest and possibly prevent an experience which might prove costly.

The end surfaces of wood columns should always be cut true and level, as shown in Fig. 1. The tendency then is for compression to be resisted equally and not to crush at one place before the remainder of the section can be brought under compression, as would be the case if the bearing surfaces were rough and uneven, indicated by Fig. 2.

Examine Timber Before Using

It is advisable to obtain thoroughly seasoned timber when used for posts, as by doing so the number and depth of air checks in the timber selected can be observed. In the use of unseasoned timber air checks might develop far beyond that which would be expected and cause unnecessary worry as to stability and appearance.

Cross-grained posts and those having large loose knots or wind shakes should not be employed, as trouble from their use frequently results before they are in position any length of time. The final penalty for their use is their ultimate removal or, if the condition should exist unobserved, their use might even result in collapse.

Table I gives the permissible safe loads in thousands of pounds on posts of spruce, white pine and fir, and was calculated with compression stresses ranging from 390 lb. per square inch of cross section to 730 lb. per square inch, dependent upon the diameter and length of the column.

Table II gives the permissible safe loads on posts of long-leaf yellow pine and white oak, the compressive stresses used in these calculations varying from 600 lb. to 1000 lb., also dependent upon the diameter and length of the column.

Should it be desired to use posts of short-leaf yellow pine, North Carolina pine or Douglas fir the compressive stresses would be three-fourths of the values used for long-leaf yellow pine. Or in the use of Table II, posts of short-leaf yellow pine, Douglas fir or North Carolina pine would safely sustain three-quarters of the safe load given under that table.

Table No. I

Size of Posts in Inches	Safe Loads in Thousands of Pounds, Wood Columns, Spruce, White Pine and Fir											
	LENGTH OF POSTS IN FEET											
	5′0″	6′0″	7′0″	8′0″	9′0″	10′0″	11′0″	12′0″	14′0″	16′0″	18′0″	20′0″
4″ ■	10.5	9.5	8.7	7.9	7.6	6.2	.....	.....	.....	.....	.....	.....
4″ ●	8.1	7.4	6.8	6.2	5.5	4.9	.....	.....	.....	.....	.....	.....
6″ ■	26.3	25.0	23.8	22.6	21.4	20.2	18.9	17.7	15.3	.....	.....	.....
6″ ●	20.7	19.8	18.8	17.8	16.8	15.8	14.9	14.0	12.0	.....	.....	.....
8″ ■	.....	.....	46.7	44.5	43.5	41.2	40.2	38.0	34.8	31.4	28.2	25.0
8″ ●	.....	.....	36.6	35.0	34.2	32.2	31.5	29.8	27.2	24.7	22.2	19.6
10″ ■	.....	.....	.....	73.0	71.3	69.6	67.9	66.2	61.1	57.7	52.6	49.2
10″ ●	.....	.....	.....	57.2	56.0	54.5	53.3	52.0	48.0	45.2	41.3	38.6
12″ ■	.....	.....	.....	.....	.....	105.0	103.0	100.0	95.5	90.5	85.5	80.7
12″ ●	.....	.....	.....	.....	.....	82.5	80.6	78.8	75.0	71.0	67.2	63.3
14″ ■	.....	.....	.....	.....	.....	.....	.....	143.0	136.0	130.0	126.0	120.0
14″ ●	.....	.....	.....	.....	.....	.....	.....	112.0	107.0	102.0	99.2	94.1
16″ ■	.....	.....	.....	.....	.....	.....	.....	187.0	183.0	178.0	169.0	165.0
16″ ●	.....	.....	.....	.....	.....	.....	.....	147.0	143.0	140.0	133.0	129.0

Use of the Tables Explained

Example:

What size square column would be required to support a load of 20,000 lb., the length of the column being 10 ft.?

Assuming that spruce is to be used, Table I would be the one with which to solve the problem.

Glancing at Table I, we find under the heading "Length of Posts in Feet" the numerals 10′-0″. Glancing down this column, we come to the figure 20.2, which is nearest the load which must be provided for. (This figure represents thousands of pounds.) Reading across to the extreme left, it will be found that the size post required will be 6 in. square.

Should long-leaf yellow pine be used it will be found, by repeating the process described for spruce, that the nearest figure to the load which has been assumed is 28.8, which will give us a 6-in. column.

Should it be desirable to use a round column for the load assumed, it will be found that a 6-in. round column of long-leaf yellow pine is the smallest that can be used for the length given.

Assuming that short-leaf yellow pine, North Carolina pine or Douglas fir is to be used, we glance at Table II and find that a 6-in. square column 10 ft. long will sustain a load of 28.8 thousands of pounds. Taking three-quarters of this we have the figure 21.6, which is more than the column needs to carry.

By repeating the process described the proper size column can be determined to meet any condition.

Table No. II

Size of Posts in Inches	Safe Loads in Thousands of Pounds on Wood Columns of Long Leaf Yellow Pine and White Oak											
	LENGTH OF POSTS IN FEET											
	5′0″	6′0″	7′0″	8′0″	9′0″	10′0″	11′0″	12′0″	14′0″	16′0″	18′0″	20′0″
4″ ■	14.4	13.5	12.5	11.5	10.5	9.6	.....	.....	.....	.....	.....	.....
4″ ●	11.3	10.5	9.8	9.0	8.3	7.5	.....	.....	.....	.....	.....	.....
6″ ■	36.0	34.0	33.2	31.7	30.2	28.8	27.4	25.9	23.0	.....	.....	.....
6″ ●	28.3	27.2	26.0	24.9	23.8	22.6	21.5	20.3	18.1	.....	.....	.....
8″ ■	.....	.....	64.0	61.4	60.2	57.6	56.3	53.7	49.9	46.0	42.2	38.4
8″ ●	.....	.....	50.3	48.2	47.2	45.2	44.2	42.2	39.2	36.2	33.2	30.2
10″ ■	.....	.....	.....	100.0	98.0	96.0	94.0	92.0	86.0	82.0	76.0	72.0
10″ ●	.....	.....	.....	78.5	76.9	75.4	73.9	72.9	67.5	64.4	59.6	56.5
12″ ■	.....	.....	.....	.....	.....	144.0	141.0	139.0	133.0	127.0	121.0	115.0
12″ ●	.....	.....	.....	.....	.....	115.1	111.0	109.0	104.0	99.5	95.0	90.5
14″ ■	.....	.....	.....	.....	.....	.....	.....	196.0	188.0	180.0	177.0	169.0
14″ ●	.....	.....	.....	.....	.....	.....	.....	154.0	148.0	142.0	139.0	132.0
16″ ■	.....	.....	.....	.....	.....	.....	.....	256.0	251.0	246.0	236.0	231.0
16″ ●	.....	.....	.....	.....	.....	.....	.....	201.0	197.0	193.0	185.0	181.0

THE EDITOR'S PAGE

Will You Spend 3 Cents to Help "Building Age" and Other Publications You Read?

Do you believe that BUILDING AGE and other high class publications have played an important part in the wide-spread diffusion of knowledge throughout the United States?

Do you believe that every American should be treated the same, regardless of what part of the United States he lives in?

If you do, then will you spend three cents to help BUILDING AGE and other magazines continue to contribute to spread knowledge and education throughout the United States?

Here, in a nutshell, is just how you can do your bit. Last year Congress passed the War Revenue Bill, which embodied as one of its features a zoning system applying to second-class mail effective July 1 of this year. This zoning system increases the postage rate of periodicals from 50 to 900 per cent. This zoning system has been discredited time and time again, having been abolished by President Lincoln in 1863. I have figures before me showing that one weekly trade publication with 8000 subscribers is going to have its postage rate increased $3,000 each year by this law. A few magazines will be able to stand this excessive rate, but many are going to be forced out of existence.

This law means one thing. That the magazines will either have to raise their rate considerably to every subscriber, or will have to adopt a zoning system of prices, which will penalize the men living far distant from the publication centers.

This latter, which is the probable solution, means that the country is going to be sectionalized and localized to an extent that is going to work serious harm to our national unity—and this at a time when we cannot afford it. We are all Americans, we must remain so, and we must have the unity of thought and action that a common language and a widespread universal press alone can obtain.

It is up to you people who read BUILDING AGE to exercise your constitutional right and to demand the repeal of this law. Write to your congressman to-day—right now—and tell him this:

"I believe that the best interests of this country would be served by the repealing of the law increasing the postage on periodicals from 50 to 900 per cent. I urge you to use your every possible effort toward the repealing of this law, and assure you that I will not forget that you have used your vote and efforts for the best interests of the American people."

Will you do this? It will help BUILDING AGE, it will help every periodical in this country. But more than that, it will help you and your children to continued enjoyment of the privileges which you now possess under the present postal regulations.

And I would appreciate having you drop me a line saying that you have written a letter to your congressman urging the repeal of this law.

Single Issue Price of "Building Age" Raised

Advancing costs of news-stand handling have forced us to raise the price of BUILDING AGE to 25c. per issue. The price per year remains $2 as heretofore. The man who subscribes thus obtains his twelve issues for $1 less than the man who buys them at the news-stands, besides having the surety of not missing any of the worth-while articles which are in course of preparation for coming issues.

War Conditions and the Building Trades

There is an interesting and valuable article on page 263 of this issue. It is entitled "How the War Has Affected the Building Trades in Indiana," and is the report of a committee on the call at Washington, D. C., regarding war conditions and the building trades in general, and conditions in the Indiana limestone district in particular.

This report is especially interesting because it shows what can be expected from a shut-down or even from the mere discouraging of building activity. Conditions in this district, as revealed by the report, are such as to decidedly show that the building industry exercises perhaps a far greater influence on the welfare of this country than is generally supposed by those who are neither affiliated with nor cognizant of its widespread influence.

Lots of Readers Have Written Letters to the Editor

In the March number I asked readers to sit down and write me a letter. I said that I liked to get letters, and that such letters would be of decided help to me in keeping in touch with the men who read these columns.

The result has been gratifying indeed. Letters—interesting, cordial, and full of ideas—have come into this office. I appreciate every one of them, and want you to keep on sending more.

Here are a few of the letters sent me. I think that you will enjoy reading them as much as I did.

Editor of Building Age:

I have taken your magazine for five years and it is the only architectural one I have not given up during war time. I have watched its growth and improvement with a great deal of interest and for this reason I am accepting your invitation on page 166 of the March number to make suggestions.

The type of house shown on pages 126 and 136 used to appear with more or less regularity, but lately they have shown a tendency to disappear and I hope that they will gradually be left out altogether. They have everything in them which is injurious to domestic design and there seems no real excuse for them when so much good work of the type shown on page 164 is being done. To my mind every encouragement should be given to the development of the simple Colonial cottage and a magazine of this standing which reaches the small householder and the contractor could do much to build up this new standard. With the rapid development in town planning and large building schemes the jig-saw type and the over-abundant use of thoughtless detail can only work harm.

ELIOT T. PUTNAM,
of Putnam and Chandler,
Architects, Boston, Mass.

Editor of Building Age:

I have the following suggestion to offer:

Subject—Family Apartment Buildings.

My idea is to show one or more sets of plans for small buildings to accommodate four or six families. These flats, each to have a small number of rooms, say living-room, dining-room, kitchen, bath-room, needed closets and dressing rooms with the use of combined closets and dressing-rooms, with the use of folding, sliding, or door beds. Showing the arrangements and needed space for these beds and other convenience.

The present every-day requirements for home comforts is drifting to small apartments of flats where the work is reduced to the minimum. There are many people, who now prefer the outdoor life with an auto, to the confinement of a large home and lawns.

BUILDING AGE has published some apartments with these conveniences, also twin houses, but these articles have not been along lines inviting attention to how space has been reduced and still give the needed accommodations at a reduced cost.

These ideas can also be applied to the smaller bungalows as well.

Where one has a free hand, space and money, it is not a hard task to produce a good design, but where all conditions are restricted it is quite a problem to gain satisfactorily results.

I believe my suggestions worthy of consideration for an interesting article on this subject.

FRANK J. GRODAVENT.
Cheyenne, Wyo.

Building Activity Throughout the United States

A LOSS of 54 per cent is the total for March, 1918, as compared with March, 1917, 129 cities reporting. Of these 32 show a gain as against 97 showing a loss. The amount of building projected, however, is much greater than that for February, 1918, due to the increased activity always present at the beginning of the season. The contemplated amount of construction is $38,050,330 for March, 1918, as against $81,786,841 for the corresponding period last year.

Cities in the eastern section of the country report a loss of 58 per cent, 41 cities showing a loss as against six showing a gain. Cities in the Middle States report a loss of 60 per cent, 29 showing a loss as against 8 showing a gain. The South reports a loss of 28 per cent, 10 out of 24 cities showing a gain. The Western cities report a loss of 29 per cent, 8 out of 21 cities showing a gain.

There are individual cases of greatly increased activity due to some special housing need in connection with war purposes or with large manufacturing plants, which reasons are the main causes for some of the increases in certain cities.

CITIES IN EASTERN STATES

	March, 1918				March, 1917			
	New Work		Repairs		New Work		Repairs	
	Permits	Value	Permits	Value	Permits	Value	Permits	Value
Albany, N. Y	155	$91,965	...	...	205	$199,090	...	...
Allentown, Pa	25	154,285	...	...	36	166,830	...	...
Altoona, Pa	34	22,239	...	...	45	29,066	...	...
Atlantic City, N. J	94	63,832	...	...	113	327,937	...	...
Auburn, N. Y	18	18,160	...	...	22	46,054	...	...
Bayonne, N. J	12	28,450	...	...	23	65,850	...	...
Binghamton, N. Y	150	47,836	...	...	...	...	...	...
Boston, Mass	35	367,800	234	233,836	141	2,140,632	324	424,791
Bridgeport, Conn	88	199,547	...	...	154	650,676	...	...
Brockton, Mass	3	2,875	12	4,890	21	29,845	22	16,435
Buffalo, N. Y	286	524,000	...	...	341	624,000	...	...
East Orange, N. J	46	226,655	...	...	52	190,464	...	...
Elizabeth, N. J	19	181,833	...	...	39	191,630	...	...
Erie, Pa	114	155,444	...	...	142	322,189	...	...
Harrisburg, Pa	32	513,605	...	...	48	183,210	...	...†
Hartford, Conn	72	136,677	...	...	143	985,695	...	...
Hoboken, N. J	3	41,337	6	1,790	3	28,150	14	10,195†
Holyoke, Mass	7	11,665	...	...	9	31,740	...	...
Lawrence, Mass	7	22,725	10	23,650	15	73,800	11	8,000
Manchester, N. H	45	18,925	...	...	83	60,816	...	...
Mount Vernon, N. Y	14	53,210	13	9,100	27	111,337	21	41,450
Newark, N. J	167	799,731	...	...	255	540,042	...	...†
New Bedford, Mass	18	39,350	...	...	26	31,825	...	...†
New Britain, Conn	9	5,450	24	16,800	11	13,500	16	3,415
New Haven, Conn	81	58,645	...	...	129	215,096	...	...
New York:								
Manhattan	17	545,700	273	828,270	36	5,206,500	331	1,212,255
Bronx	186	765,270	...	...	311	1,474,191	...	...
Brooklyn	97	1,310,480	651	447,612	184	3,770,700	873	461,442
Queens	367	1,330,220	...	...	572	1,946,490	...	...
Richmond	53	124,696	...	...	89	269,057	...	...
Niagara Falls, N. Y	26	86,572	6	5,775	54	94,648	...	...
Nutley, N. J	4	6,925	4	1,925	17	55,866	5	95
Passaic, N. J	12	7,900	14	10,275	23	281,775	15	12,725
Paterson, N. J	80	90,625	...	...	129	329,443	...	...
Philadelphia, Pa	320	908,485	299	222,300	763	3,169,935	384	300,690
Pittsburgh, Pa	322	815,072	...	...	440	1,214,596	...	...
Portland, Me	7	45,080	14	71,110	17	29,555	8	17,475
Quincy, Mass	50	270,740	...	...	68	119,222	...	...†
Reading, Pa	29	14,600	142	19,100	51	75,050	136	26,800
Rochester, N. Y	56	83,615	57	93,585	169	563,300	87	90,096
Schenectady, N. Y	24	47,465	19	7,090	36	47,570	25	16,923
Scranton, Pa	16	14,775	...	...	40	171,323	...	...
Syracuse, N. Y	51	88,250	69	34,620	112	206,730	87	83,910
Trenton, N. J	46	115,037		...	69	210,338	...	...
Utica, N. Y	21	37,750	...	...	36	114,120	...	...
Wilkes-Barre, Pa	78	46,880	...	...	98	72,042	...	...
Worcester, Mass	91	60,341	...	...	148	624,761	...	...
	3525	$10,776,264	1997	$2,109,848	5854	$27,823,517	2608	$2,870,088

CITIES IN MIDDLE STATES

	March, 1918				March, 1917			
	New Work		Repairs		New Work		Repairs	
	Permits	Value	Permits	Value	Permits	Value	Permits	Value
Akron, Ohio	189	$303,045	69	$29,115	446	$1,682,310	109	73,840
Canton, Ohio	123	270,575	...	...	142	490,875	...	...
Cedar Rapids, Iowa	19	81,000	...	...	31	375,000	...	...
Chicago, Ill	280	2,529,650	...	...	762	11,519,650	...	...
Cincinnati, Ohio	108	165,800	235	125,550	276	992,190	363	149,940
Cleveland, Ohio	1016	2,709,055	...	...	1341	1,973,030	...	...†
Columbus, Ohio	148	325,240	88	53,570	223	523,690	70	47,555
Davenport, Iowa	93	710,000	...	...	80	91,444	...	...†
Dayton, Ohio	166	220,993	...	...	144	130,327	...	...†
Des Moines, Iowa	78	174,170	...	...	78	261,490	...	...
Detroit, Mich	318	733,135	198	367,695	832	3,792,830	262	1,156,105
Dubuque, Iowa	12	13,300	...	...	20	309,450	...	...
Duluth, Minn	114	271,297	...	...	92	2,087,055	...	...
East St. Louis, Ill	37	119,429	...	...	41	77,155	...	...†
Evansville, Ind	11	39,875	98	11,232	38	67,455	67	12,490
Grand Rapids, Mich	73	76,530	...	...	136	200,454	...	...
Indianapolis, Ind	462	334,719	...	...	603	1,086,688	...	...
Kansas City, Kans	32	121,125	...	...	65	191,125	...	...
Kansas City, Mo	163	228,970	...	...	446	1,478,720	...	...
Lincoln, Nebr	37	58,995	...	...	67	144,966	...	...
Milwaukee, Wis	188	620,824	...	...	238	1,228,634	...	...
Minneapolis, Minn	436	588,995	...	...	357	707,020	...	...
Omaha, Neb	55	265,430	...	...	115	365,385	...	...
Peoria, Ill	36	82,975	...	...	56	162,853	...	...
Saginaw, Mich	12	28,965	...	...	23	137,363	...	...
St. Joseph, Mo	40	224,962	...	...	78	193,109	...	...†
St. Louis, Mo	271	372,611	371	183,525	404	973,707	433	305,437
St. Paul, Minn	85	233,287	...	...	94	463,765	...	...
Sioux City, Iowa	39	149,650	...	...	38	111,850	...	...†
South Bend, Ind	33	21,356	21	8,111	87	104,368	46	17,920
Springfield, Ill	21	40,375	35	14,905	31	60,970	24	33,150
Superior, Wis	68	71,525	...	...	32	188,490	...	...
Terre Haute, Ind	32	46,205	49	58,820	36	42,415	29	8,145
Toledo, Ohio	156	155,530	...	...	382	1,149,269	...	...
Topeka, Kan	36	28,070	...	...	43	61,845	...	...
Wichita, Kan	125	670,650	...	...	93	618,995	...	...†
Youngstown, Ohio	151	346,785	28	16,600	124	308,300	26	15,175
	5263	$13,473,922	1192	$869,123	8094	$34,264,242	1429	$1,819,757

CITIES IN EXTREME WESTERN STATES

	March, 1918				March, 1917			
	New Work		Repairs		New Work		Repairs	
	Permits	Value	Permits	Value	Permits	Value	Permits	Value
Berkeley, Cal	29	53,800	21	8,300	40	70,000	52	14,000
Boise, Idaho	..	...	31	12,847	3	11,000	23	7,735
Colorado Spgs., Col	8	8,030	9	3,150	8	29,030	17	20,845
Denver, Col	110	93,000	115	79,650	138	465,380	139	75,730
Eureka, Cal	2	34	3	12	9	16,780	10	6,500
Fresno, Cal	65	425,510	64	31,198	51	215,300	58	18,472†
Long Beach, Cal	139	252,280	46	12,050	62	100,165	40	7,630†
Los Angeles, Cal	313	670,433	239	146,516	454	1,173,859	289	166,101
Oakland, Cal	178	335,148	72	26,850	204	516,089	84	24,584
Pasadena, Cal	26	22,677	40	11,706	50	151,134	60	13,695
Portland, Ore	276	269,840	188	74,735	163	204,475	169	57,725†
Pueblo, Col	36	18,206	...	...	55	55,365	...	...
Sacramento, Cal	64	87,659	...	...	86	213,171	...	...
Salt Lake City, Utah	74	149,775	...	...	88	205,150	...	...
San Diego, Cal	56	144,850	64	30,442	65	87,230	67	23,895†
San Francisco, Cal	57	622,967	323	135,119	170	1,869,370	427	171,357
San Jose, Cal	31	38,995	...	...	24	24,665	...	...†
Seattle, Wash	954	934,155	...	...	755	583,795	...	...†
Spokane, Wash	63	36,312	50	26,350	79	91,780	43	39,780
Stockton, Cal	50	120,910	...	...	75	116,062	...	...†
Tacoma, Wash	192	237,165	...	...	139	176,173	...	...†
	2723	$4,521,746	1265	$598,925	2718	$6,375,973	1478	$648,049

CITIES IN SOUTHERN STATES

	March, 1918				March, 1917			
	New Work		Repairs		New Work		Repairs	
	Permits	Value	Permits	Value	Permits	Value	Permits	Value
Atlanta, Ga	61	$425,333	181	$109,913	50	$410,765	162	$88,448†
Baltimore, Md	58	140,795	519	153,254	100	853,045	981	359,925
Beaumont, Texas	76	158,463	35	44,413	35	86,545	40	21,774
Birmingham, Ala	73	393,458	235	41,798	84	194,184	350	42,700†
Charlotte, N. C	26	77,915	8	7,430	36	73,095	...	...†
Chattanooga, Tenn	181	35,625	...	...	171	82,977	...	...
Corpus Christi, Texas	11	3,325	...	...	16	28,055	...	...
Dallas, Texas	35	86,549	29	61,509	60	959,210	40	42,985
Ft. Worth, Texas	43	280,891	...	...	82	480,520	...	...
Huntington, W. Va	37	64,832	...	...	81	189,245	...	...
Louisville, Ky	126	237,320	38	17,705	123	219,140	48	11,900†
Miami, Fla	49	53,200	...	...	143	343,180	...	...
Montgomery, Ala	114	16,083	...	...	167	66,910	...	...
Nashville, Tenn	527	73,652	...	...	411	352,884	...	...
New Orleans, La	37	440,962	23	17,846	113	279,346	11	5,125†
Norfolk, Va	79	643,005	...	...	61	154,472	...	...†
Oklahoma City, Okla	125	392,230	...	...	81	354,575	...	...†
Richmond, Va	35	167,170	45	34,180	76	375,348	61	115,518†
San Antonio, Texas	291	471,000	...	...	202	206,635	...	...
Savannah, Ga	23	17,390	...	...	35	101,475	...	...
Tampa, Fla	75	29,908	...	...	95	142,635	...	...
Washington, D. C	127	591,100	254	194,765	110	449,830	266	177,533†
Wilmington, Del	62	83,675	48	51,950	58	92,781	48	622,455
	2382	$4,960,740	1415	$739,763	2390	$6,496,852	2007	$1,488,363

Side Lines and Trade Builders for the Dealer

Some Out of the Ordinary Methods Used by Retail Lumbermen to Increase Their Sales

By Frank Kneisley

THE old and easy way to run a country lumber yard is to carry a limited supply of the most usual items of building materials and let your customers either buy what you have or get it some place else.

An old custom, long since out of date but still adhered to by some country dealers, limits a retail lumberman to a very narrow field of endeavor. To comply strictly with the mandates of this old antedated system a retail lumberman is supposed to confine his stock to staples. Under certain very pressing exigencies he could order some foreign item for an old customer. But he isn't supposed to cater to this thing of ordering special stuff. It necessitates extra work and creates chances for mistakes. There are mail order concerns and real live merchants to attend to these special cases for him.

The unprogressive lumberman has a nice little pet bunch of ethics of his own, and to break away from the regular way of things would be unethical. When business is good he is delighted and feels he is a big part in the cause of its being good. And when business is poor he is much depressed or else accepts conditions as a matter of course. As he doesn't feel that he is to blame, he does nothing to help matters.

But it isn't the ordinary, old-time, middle-of-the-road lumbermen I want to discuss at this time. It's the extraordinary, self-starting bunch of live ones who are originating and putting over ingenious and new ideas that I want to tell about just now. I know some country lumbermen who just won't let business slow up —not if there is a possible chance to keep it going the limit. If people quit building or slow down on buying, these fellows, instead of placidly accepting existing conditions and taking an easy seat in their office, or sighing and prophesying and legislating with the crowd of dissatisfied up in the court house yard, dig up a new idea, put their personality and punch in it, advertise it, and, presto! the idea is put over good and big. Sales are not allowed to limp, business maintains a cheery, thrifty appearance and gloom and stagnation are not allowed to light anywhere around the place.

So it is mostly a matter of getting something to sell that is worth while, learn a lot about what you are offering for sale, talk it and preach it, and presently the community is talking about and buying the thing you have to sell.

I know some country lumbermen who just won't let business slow up—not if there is a possible chance to keep it going the limit. If people quit building or slow down in buying, these fellows, instead of placidly accepting existing conditions and taking an easy seat in their office, or sighing and prophesying and legislating with the crowd of dissatisfied up in the courthouse yard, dig up a new idea, put their personality and punch in it, advertise it, and, presto! the idea is put over good and big. Sales are not allowed to limp, business maintains a cheery, thrifty appearance and gloom and stagnation are not allowed to light anywhere around the place.

I have in mind three instances where clever and somewhat out of the ordinary, but none the less sane and legitimate, selling plans were used with phenomenal success. Two of these came under my own observation. The other was told to me by a salesman who is most reliable.

In a certain splendid agricultural section the farmers were experiencing much trouble with rains washing great ditches through their farms. The consequent loss of rich top soil carried away during every rainfall was getting serious. Rolling and hilly land especially washed the worst. Brush and straw in the ditches soon rotted or were carried away during heavy rains. One of the lumbermen in this section had heard and read about Soil Saving Dams being successfully used in another part of his State. These Soil Saving Dams were dirt dams across a ditch or hollow with a line of vitrified pipe placed at the bottom and through the dirt dam to carry away the water as it was brought down the ditch. The system was so arranged that it collected all the loose soil and allowed the water to escape through the pipe. Likely most dealers and farmers are now familiar with these dams, although they were new then. This live lumberman at once got all the information on the subject he could. He even made a trip to another part of his State where these dams had been installed and personally examined and studied the system from every angle. Then he went back home and began an educational and selling campaign among the farmers in his section. He mailed out pamphlets, personal letters, had personal talks with many of the farmers and ran conspicuous ads in the leading papers of his county. He offered to make a personal visit to any farm in his county and prepare a chart showing the location and cost of the proper system daming—all free to the farmers. He had studied and experimented with these dams until he knew exactly what he was talking about. And with this confidence in his own knowledge and ability he had no trouble making the farmers believe in him. So it wasn't long until he had more calls from the farmers and land owners than he could attend to. Then he employed an

assistant and took him along on his visits among the farmers and taught the assistant while he himself was "missionarying" and selling sewer pipe. He made it a point to personally superintend the installation of one dam in every neighborhood in which he sold the pipe. By doing that he was assured that the dams would be properly constructed and made his customer and other farmers in that community like him better and talk about and install more dams. He did his first campaigning during the late winter and fall months, before the rains started and when both he and the farmers were not very busy.

The result of his first five months' work was the sale of nine big cars of sewer pipe—sold at a nice profit.

The acquaintance he made among the farmers and the splendid service he rendered them cannot be measured in dollars and cents.

Plans and Estimates Shown to Prospects

Another wide-awake lumberman in a good size and prosperous country town had a very novel way of creating business. This town was an old one, made up of a great many wealthy people who lived in big, old-fashioned houses. Their wives and daughters belonged to the local clubs, dressed stylishly and well, and kept apace with modern ideas. But their houses were not modern. Some had small porches, or the porches were badly run down. Others had narrow entrances. Some had ill-proportioned and wrongly located windows. This one had a hideously steep roof. Another was a crime with its brackets and spindles and gingerbread in an effort to out-do some neighbor or fellow townsman.

Most of the older houses needed more or less alterations to bring them to anything like a modern appearance and get in a class with a few of the houses built later—frequently by a fellow clubman.

This lumberman was a pretty fair sort of an architect. Also he was artistic and a good designer and kept up on the latest things in architecture and building materials. And he knew people—which is a whole lot. So from time to time he would pick out one of these old houses—one that he thought could be modernized with the least cost and show the biggest change. First he would take a photograph of the front. Then with his tape and rule and paper he would make a rough sketch of the old building. Within a few days he would have a complete sketch of the house showing how it would look with the alterations. A wide porch with big columns, new entrance, new windows, roof changed—or whatever was necessary to give the house that modernly correct and pleasing appearance. The proposed alterations would so completely change the appearance that the old house could not be recognized. Sometimes the front elevation would be touched up in soft tones of water colors. An estimate of cost of the improvements would be made. Then at some opportune time this alert lumberman would call on Mrs. Householder. He invariably submitted his plans only to the women folks. He would explain his plans very fully and adroitly and convince Mrs. Householder and her daughter or daughters that the alterations would make their home as good looking and modern as any in town. Then he would refer to the surprisingly low cost of all the proposed changes. He would leave the plans at the house. He had a pretty good idea what would happen. His biggest boosters from then on would be mother and the girls. Maybe father would get all fussed up and refuse even to consider such a thing, but he could afford it and mother and the girls were no quitters. Once in a while this lumberman's little selling scheme failed to work out, but I believe that three-fourths of his prospects built according to his plans or made some sort of improvement at least.

Business begets business. It's just as satisfying and encouraging to people to see business on the jump as it is discouraging to see it looking pale and down in the mouth. People buy what they see or hear of others buying. That's the secret of the success of the street faker. He knows that if he can get one or two started to buying most of the crowd will buy. Buying is largely contagious.

Modernizing old houses in that town got to be a craze. Everybody was either fixing up their home or talking and planning on doing it. The air was full of the spirit of building. And they are still improving their homes in that town. The place has undergone a big change within three years. Everybody is taking more pride in their homes. This hustling lumberman with an original and unique idea started the town to doing something for itself. It is fast getting a reputation for beautiful homes.

Why This Dealer Succeeded

That lumberman's experience is a fine example of selling an idea. Instead of piling up a lot of lumber and shingles in his yard and waiting for customers to feel the actual need of something he had for sale and going to his yard after it, this lumber dealer went out and created a demand for his material. He simply gave them his idea and service and sold them the house. But it required his idea and service to sell the material. A pile of boards or shingles in a lumber yard hasn't anything particularly attractive about it to the consumer. So this dealer didn't try to sell so many feet of lumber. He sold the finished product—a beautiful and modern home created from their old house. If that dealer had tried to sell so many feet of lumber at so much per thousand to his prospects he would have had poor luck indeed. But the secret of his big success was the fact he was selling a home and not lumber—just the same as the automobile salesman sells an automobile and not a lot of steel and rubber and leather.

I was told of another lumberman with an originating turn of mind and an excess of energy who wasn't content with the dull monotony of selling boards and shingles. So he designed a child's play house and had three or four of them built by a local carpenter as an experiment. I don't remember the exact dimensions, but believe they were 8 by 10 feet and 6 feet high inside. They were of modern design, well built and provided with neat windows and a front door. An overhanging porch was placed at the front. Stock siding was used on the walls and the roof was shingled and stained. They were attractively painted.

That much for the description of the houses. Maybe other dealers have made and sold children's play houses. So the idea of the thing itself may not have been original with this particular dealer. But his big success with these houses can be attributed wholly to two things, namely: the attractive and artistic design of his play houses and his manner of creating a demand for the thing he was selling.

His three sample houses were placed side by side on a vacant residence lot which happened to have a nice lawn and shade trees. That was a whole lot better than placing them on a barren lot or sticking one of them back in his lumber yard. The green grass and shade trees made up a big part of the selling talk.

A neat sign announced the houses were for sale by this lumberman.

No further evidence is needed to convince anybody who ever saw a child what happened in that town. Of course every child wanted one of those play houses. It is a child's nature—all of us for that matter—to want what some other child has. So it is the parents' nature to give their child what some other child has—even at a dreadful stress of their pocketbook.

So the sample houses were soon sold.

The dealer had more built. By having several made from one pattern he economized on material and labor. Very probably he didn't sell a house to every child in town, but I am told he did sell many of them.

He made a hit with the kiddies, got a lot of publicity and did a profitable business in the meanwhile. Maybe some of the parents in that town haven't forgiven him yet. I don't know about that.

From the experience of these three dealers we are again reminded that the retail lumber business is considerably more than piling unattractive boards and shingles in the sheds and being satisfied to sit in the office and let the public come to us with their wants. It has reached the point where new ideas, service and the ability to create demands for the things we are selling must play a big part in the business. Mail order houses have grown prosperous and popular in communities where these business essentials are lacking.

More Selling Ideas!

More Service!

More Business!

The Proper Size Truck for Your Business Is an Important Factor in Economical Operation

Suggestions Affording Opportunity for Better and Cheaper Delivery

By C. J. Thompson

ONE of the most important factors in Good Business for the Lumber Dealer is Good Service to his customer. Another is economy — not only of money but of time. Viewed from this standpoint, the motor truck must be conceded an ever-growing place in every branch of the lumber industry.

It seems to be the opinion of a great many lumber men that there is no appreciable saving in operating expense through the use of trucks, but that through the improvement in service, and also through the advertising afforded by a truck, the dealer is afforded an increase in patronage which more than compensates for the slight increase in "overhead." One Alabama firm writes, "Our business grew from the first putting into service of a 1½-ton truck. We attribute this to prompt service."

How Can Motor Trucks Be Efficiently Used in Lumber Business?

In this connection it should be noted that the efficient use of motor trucks in this business requires:

1. Trucks of proper capacities for the loads to be carried.

2. A system of loading and unloading which affords a minimum expenditure of time.

The lumber dealer who contemplates the purchase of a truck for his hauling should make a careful study of his needs and of the various types of trucks on the market. In most instances it is more disastrous to buy a truck too large for the work than to buy one that is too small. This is particularly true in sections blessed with good roads, where some over-load is always possible. A 5-ton truck costs some 25 per cent more to operate than a 3-ton machine, nor is this cost reduced very much by taking a lighter load on the heavier truck. Interest, depreciation, maintenance, taxes, insurance and fuel—all are higher. Until recently the tendency has been for owners to buy trucks too large for their needs. Now the buyers have begun to realize that it costs too much to "deliver the vehicle."

Occasionally one finds dealers who are convinced that there is no economy in the use of a truck, and who seem unduly sensitive on the subject. If the truth were known it might be found that this dealer's unfortunate experience was due to nothing but his own lack of judgment. Perhaps he had a retail business which called for quick deliveries of small orders, and occasional hauls of a couple of thousand feet. Suppose, then, he had bought a 2 or 3-ton White truck. Without doubt his experience would be disastrous.

On the other hand, suppose he needed a truck for delivery of all kinds of building materials to a country trade, over rough mountainous roads—and had purchased a 1-ton Ford and expected it to do the work.

Importance of Proper Size Truck

There is no doubt but that there is a place in the lumber business for any good truck. The big question is to select the one which meets your needs. Don't expect a light 1-ton truck to carry 6000 feet of lumber over ten or fifteen miles of heavy roads—and don't expect it to haul a heavy trailer too. Incidentally, don't expect to save money using a 5-ton White for your small, city rush order business.

In connection with the matter of economizing in time in loading trucks, the following statement from C. E. Morton, Pacific Coast district manager for the Packard Motor Company, is interesting:

"Lumber dealers used to say that motor trucks never could take the place of horses in their business, but they have. How a little study of the lumber trucking problem will work out to great advantage is well illustrated by the experience of Melvin Savage of San Francisco, who lets his Packard trucks out to the Christenson Lumber Company. Not only has he solved the long-haul problem, but the short-haul problem and quick-loading and unloading ones too.

How a Dealer Secured Motor Truck Efficiency

"Old lumber wagons equipped with rollers serve as platforms on which the load is placed in the yard. The truck is backed up to the load and the load rolled on. Arriving at his destination, the driver dumps the load in the same manner as the ordinary roller-bolster lumber wagon. Loading and unloading are accomplished in five minutes. While the trucks are on the road the platforms are being loaded in the yard, so no time is lost.

"It is possible with this system to load, unload and complete a round trip of two miles in less than a half hour. A short time ago Mr. Savage unloaded a car of 16,500 feet of lumber, or 49,500 pounds, and delivered it to the yards three-quarters of a mile away in six hours with one truck. All loading was done by hand.

"Frequently Mr. Savage takes contracts for hauling lumber to Burlingame Hills, 21 miles out of San Francisco. He makes three of these round trips, or 126 miles, in fifteen hours, including loading and unloading time and a half hour for the driver at noon. On each trip he hauls 3500 feet of lumber, each load weighing about five and one-half tons. Two miles of the stretch is steep, uphill work.

"Three Packards now form the Savage fleet. The owner has found that each truck does the work of four teams."

Methods Which Secure Efficiency in Loading

There are various other devices similar to the one described above for securing efficiency in loading operations. Trucks equipped with rollers solve this question in a way that is as satisfactory as any. The object in the case of any of these schemes is to effect an arrangement whereby loading operations can be going on while the truck is out of the yard, so that when it returns the load is ready for it and can be rolled on to the body of the truck without delay.

In some instances the lumber is rolled forward from stands or wagons on which it has previously been stacked. The rolls are geared to each other, the gearing being arranged in such ratios as to enable the rolls, cranked by hand, to be turned easily by one man. Usually a man gets at the crank on the truck and another at that on the yard-wagon or stand, and the big pile, which may weight five or six tons, is transferred without delay.

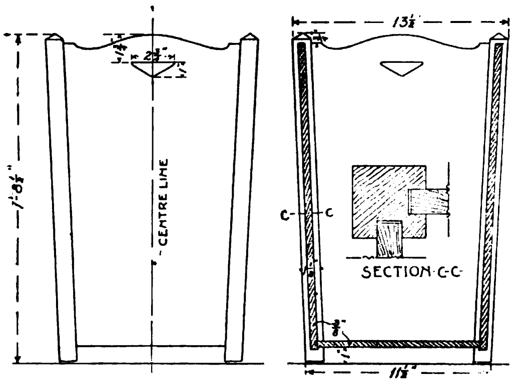
If the lumber is to be delivered onto the ground, it can be rolled off in the same way, a chain, fixed with one of the patented clamps which have come into use, holding it together. Or, in the case of wide lumber, especially rough stock, stacking it at alternate ends every few courses holds it together and enables it to be dumped without chains.

The necessity for some such steps being taken is apparent if the investment is to prove profitable. A truck represents more capital than horses and wagons, and the dealer cannot afford to have this large amount of capital standing idle, as it would when loaded in the ordinary way.

Use Small Size Lumber to Make a Waste Holder

By *John Wavrek, Jr.*

THIS waste holder has been designed with the idea of using up small sizes which collect in large lots in planing mills. A waste holder of the kind shown is suitable either for the home or office. It may be made up of any kind of lumber and treated to match the finish of the room wherein it is to be placed.



Figs. 1 *and* 2 *are Elevation and Section on Center Line of Waste Holder*

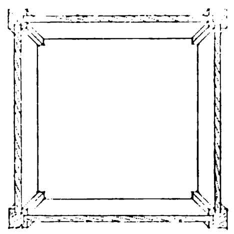


Fig. 3. *Cross Section of Waste Holder at the Left.*

The construction, as will be seen by consulting the details, is very simple. For the uprights we use four pieces, 1⅛ in. x 1⅛ in. square by 21 in. long, surfaced on four sides. The upper ends are cut at 60 deg. angle to form a finish as shown. The lower end is also slightly chamfered as shown. The next procedure is to plow the uprights for the sides; it is not very important what thickness should be used; this depends very much on what kind of stuff you may be able to get at the mill. The sides shown in the sketches are made of ⅜-in. veneered panel stock which happened to be around; they may be made of ½-in. stuff or even compo wall board. The legs are plowed starting ¾ in. from the top to within 1 in. from the bottom, as shown in sketches.

Next we will make the sides, the size of which are 11¾ in. at the top and 9¾ in. at the lower end. As shown in Fig. 1, a center line is drawn through the full length of the board intended for the side. Mark the length on this center line, which is 1 ft. 8½ in. Mark 5⅞ in. each side of the center line at the top and 4⅞ in. at the bottom; this gives the cut of the side lines. The bottom line of the sides is cut straight across at right angles to the center line. The upper edge may be cut any suitable shape, but the style shown in the sketch, Fig. 4, is neat and not difficult to make.

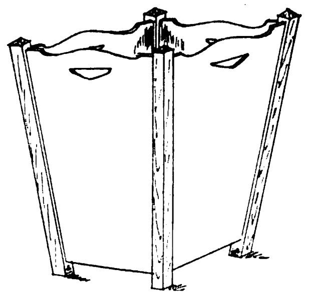


Fig. 4. *Perspective of Waste Holder*

At a distance of 1¾ in. from the top of the side draw a horizontal line 2¾ in. long; next mark a point on the center line 1 in. below this line, bore ½-in. holes at these three points and connect the holes with straight lines, making the outlines of a hand hole. This hole can be sawed out with a hole saw or a jig saw. Now having marked all the outlines of one side you can tack the four sides together and have them sawed out in one operation at some planing mill or furniture factory at very little cost.

The legs and sides being ready, the sides may now be put into position into the plow of the legs (first putting some glue therein) and may then be clamped together and squared. When the glue is perfectly dry remove the clamps, mark off a piece for the bottom and fit in as shown by section on *A-A* in Fig. 2 and on *B-B* of Fig. 1, as illustrated in Figs. 2 and 3.

How to Improve Your Collection Methods

It Is Just as Important to Get Your Money After You Get Business as It Is to Get the Business

By *Edwin L. Seabrook*

> **This article is a practical talk on a subject that is full of interest to dealers and builders. Read it, and send us some of your own ideas and methods of collecting accounts promptly. We'll pay you for your ideas and you will also have the satisfaction of helping along your friends in the trade.**

EVERY dealer and builder in his business conduct must deal with three elements—material, men methods, or that intangible thing termed "management." In a very broad sense it may be said that methods are linked in his dealings with material and men. If his methods of doing work are faulty, the result is evident to the eye. If his methods in handling men are not correct, this is evidenced by the amount and quality of work produced. These can be quickly discerned because they come under his observation and can be seen.

There is, however, another application of methods or management, the results of which may not be apparent to the eye, as the case of work poorly constructed, but are just as vital to the business conduct as the others are to the mechanical. Method is just as essential to business conduct as in the erection of a complicated piece of work.

Credit Essential

Credit in the building business is almost a necessity in some form for nearly all of the business transacted. There is but little cash over the counter for the builder. Credit being a necessity it is well to look at some of the methods by which this credit is conducted on the part of the builder, and the reflex action on himself by his management of this important feature of the business.

Every business worthy of the name must have and give credit. It is one of the most essential factors in business. It is recognized as one of the greatest

conveniences, even if it is not a positive necessity on the part of those using it. To secure credit it is necessary to pay, and to pay it is necessary to collect. It is an exceptional business man who can maintain good credit and neglect collections. There are many who have poor credit because they are poor collectors. The very best asset that any business can have is credit. Not the credit that is given because it is believed the bill will be paid some time, but that kind of credit that virtually compels a business house to put itself to extra trouble when necessary to serve; to give its very best to hold high credit custom. This kind of credit can be maintained only by paying—and inversely getting in the money to pay out.

Why Credit Is Lacking

Many men in the building business do not have the credit they ought to have because their obligations are not met with any degree of promptness. The failure to do this can in many cases be traced to the poor credit management of the owner of the business. He gets the contracts, but his lax business methods do not get in the money to maintain his credit. He spends lots of time going after the work and directing it, but leaves the one essential feature of his business—management—as a side issue for the spare moments.

It is well to bear in mind that working capital should always be kept a little ahead of the business. This may be cash or credit; the latter is equal to cash, but to be maintained must be taken care of the same as cash. Any business, however small, can secure all the credit that it needs, provided that credit is taken care of and the obligations met at maturity.

Proper Bookkeeping Necessary

The first step in the credit system of the builder, to secure prompt collections, is proper bookkeeping, and that kept up to date. Sluggish bookkeeping methods retard the growth of a business despite the oft-repeated excuse: "Too busy to get the bills out." There is no use of doing work unless it is to be paid for within the limits usual to sound business practice. If a piece of work is never too small to be well done, no business item is too small to have its accounting well done and on time. The items for which bills are to be rendered should be entered on the books at once. Time slips showing the labor and material on different items of work should be charged and not allowed to accumulate. Each day's business, so far as it is possible to get it in form for charging, should go on the books not later than the following day, put there in shape to bill at once.

Render Bills Promptly

Prompt rendering of the bill is the second essential step for a good collection system. If the work is finished to-day, why wait one or two weeks before sending the bill? Send it to-morrow. Don't expect the customer to be over-anxious to pay the builder when dilatoriness has been his rule in rendering the bill. When the work is done the customer has a right to the bill. Good business management, on the part of the builder and customer, demands that it be sent.

Adjustment of misunderstandings and disputes will be facilitated by a prompt receipt of the bill. These things are more easily cleared up thirty-six hours after the work is done than thirty-six days. There is absolutely no good reason, in one case out of a hundred, for holding repair bills, etc., until the end of the month. The reflex influence of the habits and methods of the builder upon his customers must not be underestimated. Like certainly begets like. If it takes the builder a month to make out a bill, the customer will take his own good time in making payment. The customer who knows that "Jones will want his money when the work is done" will be more prompt in paying him than he will the one who takes a month to get the bill to him. Therefore, let the customer have the bill as soon as possible after the work is done. "Haven't time" may be an excuse, but not a reason. Time will be saved by attending to business details in their proper order.

Terms of Payment

The typographical make-up of a bill-head is of less importance than the bill itself, its terms of payment, etc. Have as little printing on the bill-head as possible. The terms of payment should be very definitely stated in the bill. After the word "terms" should be written when payment is expected. Let the customer see that these terms apply to him personally and not to everybody in general. How many invoices does the builder get from his source of supplies in which the terms are not clearly and definitely stated.

The words, "net cash," "interest will be charged on all overdue accounts," etc., when printed on the bill are of doubtful value. If the bill is to be paid within ten, twenty or thirty days, or if 2 per cent is allowed if paid within a definite time, state it clearly and make it personal to the individual customer.

Prompt Collections Retain Business

More business is lost than gained by easy-going collection methods. Some men hesitate to ask for a settlement when the account is due, because of a fear of giving offense and losing future business. Nothing is farther from the truth. Insisting upon payment when the bill is due will retain business rather than drive it away. There is nothing in the theory that persons will not continue to deal with firms insisting upon prompt settlements at maturity. Experience proves the reverse to be true. The firms most insistent on accounts, being paid promptly, hold their customers best. If a property owner wants something on credit from the builder, which one will be more likely to get it—the one to whom he owes an overdue account, or the one to whom he owes absolutely nothing?

A Definite Policy

All bills will not be paid when due; therefore, no matter how small the business, some kind of a collection system is necessary. It is at this point that the element of methods or management mentioned above becomes absolutely essential. No collection system will succeed without a definite policy. The haphazard plan will produce like results. To render a bill one time immediately after the work is done, and at another allow a month to elapse, will be productive of a like response from many customers. To be persistent one month and lax the next is not following a definite plan.

Whatever plan is adopted it must be followed regularly, month in and month out. Persistence must go hand in hand with a definite system. To speed up the slow pays, overdues, etc., for a month and then forget them for a time is largely lost motion. The effect of previous efforts is lost by the delay in following up. The intermittent method gives the presumption that any collection effort is spasmodic. The price of successful collections is keeping everlastingly at it. The delinquent debtor is hoping for a let-up; he is matching his patience against your persistence.

At the beginning of each month a list of delinquents should be made out. From ten days to two weeks is long enough to wait for a response. Nine-tenths of the effort will be lost if there is a let-up, or if this part of the clerical work is left to suit the convenience of everything else.

Someone says: "Haven't time to do all this." Which is the most important part of the business—getting work, doing work, or getting in the money to keep the business going? Lack of time is a poor plea for neglecting collections. The builder who has money with which to do business can generally get the business to do. Overdue book accounts do not pay bills.

Settlement Demands

There should be but one reason given for demanding payment when an account has reached maturity. *The account is due.* That reason alone is sufficient and no other one ought to be given. The creditor has fulfilled his part of the obligation, the time has come for the debtor to do his part. Some people offer all sorts of excuses in asking for payment, as though something were being done that demanded an apology. The case-hardened debtor seldom sympathizes with "short of funds," "need the money," "have heavy payments to make," etc. These may be true, but why advertise them?

Some losses in business are bound to occur and no credit system is infallible. There are losses that might have been avoided by persistent collection methods. In every system some kind of notice or letter is generally necessary.

Many of these fail because the debtor is put in a general class, when he ought to be singled out and made to feel that

his account is receiving personal attention. He knows that there are others just like him, but why tell him so in a printed form letter? Make every letter personal to the debtor. If a form letter is used, have it typewritten for each one to whom it is sent.

Keep away from stereotyped expressions; these mean little or nothing to the debtor. Something like *"No doubt this has escaped your attention,"* stamped on an overdue account is hardly believed by either party to the transaction. A series of follow-up letters can be composed, making each one a little stronger than the preceding. There are a number of form letters, applied to the individual, that have produced splendid results. In composing such a series, keep close to your debtor. He always feels safe in a crowd, also neglects or overlooks at long range.

Bluffing, threatening, discourtesy, seldom produce results. These irritate the honest man and roll off the dead beat. Study the things that influence people to action. There are motives by which the debtor, if he has anything with which to pay, can be moved to pay. Let him understand that you are after him and will keep after him until he pays up. Let him understand that you keep your collection promises and expect him to do likewise. If he promises to pay on a certain day, make it clear that there must be some reasonable response on that date. The debtor will have a wholesome respect for the creditor that keeps his word. Don't threaten to sue in one letter and repent in the next. If forced to say that you will bring suit at a certain time, do it. Don't overlook the fact that courtesy, commonsense and persistency are the greatest factors in successful collecting.

Many business men overlook the fact that outstanding bills are a part of their capital, and that capital, to earn a profit, must be kept moving. Overdue accounts are certainly in the non-earning class.

One of the largest, and shrewdest, business men in the country some time ago made the remarkable statement that if his company could shorten its average credits but a single day, it could make an additional profit of $100,000 in a year. How much more business might the average builder do if he could make himself a better credit man in handling not only the accounts due him, but those due others. The capital turn-over problem is none the less pertinent to the building business than to the hardware, clothing or any other merchant.

The Greatest Asset

Credit is the greatest of business assets. It cannot be insured against loss, nor locked in a vault. While it is a part of the business that cannot create it, yet it may destroy it.

Credit is something apart from what a man is worth in money. His statement does not create credit, it merely tells of how much he is worth.

The two corner stones of credit are honor and truthfulness. These mark the reliable man—one who may be trusted with that which is another's. That is the essence of credit.

Individual capacity is an important factor in credit. Many honest, reliable men lack capacity.

Here, then, is credit: Honor, word, capacity—these three make it. The amount of this world's goods simply measures it.

Credit built in a lifetime may vanish in a day. One obligation wantonly disregarded, one statement proven false, and it crumbles.

Credit is the most valuable of the individual's assets, and is his only so long as he carefully conserves it.

AS SEEN BY THE MAN ON THE ROOF

WHAT MORE NATURAL ?

"The voraciousness of the ostrich is remarkable," said the returned traveler whom everybody doubted and nobody disputed. "I know of a case of a pet ostrich that was tied to an oak post for safekeeping over night and during the night ate up the blooming oak post. What do you think of that?"

There was a momentary and painful silence, and then the man at the end of the table quietly remarked:

"And I suppose that the next day the bird laid a hardwood floor."

SOME CYCLONE

We have heard about the cyclone in Kansas that caught up a flock of sheep and held them pinned against the side of a barn until they all died of starvation, and we were inclined to doubt the story until a Missouri contractor wrote in and swore that he made an excavation for a new building recently and one night a windstorm blew the excavation over into the next county.

HE HAD HEARD DAD

The class was discussing mythology. "How did the ancients account for thunder?" asked the professor.

"I suppose," ventured the son of a carpenter, "they thought that that was Thor when he couldn't find his hammer."

STANDING OUT

"To whom did Easymark, the contractor, leave his $50,000?"

"He left it to his estate to collect."

WE ARE

Minister—Every man is architect of his own fate.

Visitor—Yes, and most of us are bum architects.

OBSERVATIONS

A man seldom gets home so late he finds supper ready.

I do not believe that Germany will ever reach victory in the sub way.

Life in some suburbs is just one paving assessment after another.

It would be a healthy salary that grew as fast as a man's desires.

There are a good many excuses for bad work, but not many good ones.

When a man considers his income he wonders what will be the outcome.

It is getting so a sardine in oil costs almost as much as a portrait.

A good deal of money drifts into my office, but there is an awful undertow.

Too many people try to keep raiment up to date instead of payment.

Trolley service is like the little girl, but when it is bad it is worse than that.

The real estate man said the improvements were all in, and they certainly looked it.

The man who says he would like to have a little garden of his own may be thinking of Mary.

No real estate man will tell you how far out a lot is, but he will tell you how close in.

Most of the domestic unhappiness in this world is due to six-room houses with ten-room ideas.

Suggestion for a slogan for the suburbanites at Mudhurst: "Have you a little ferry in your home?"

Our grand-dads would have been glad to take our wages and say nothing about the high cost of building.

When a man looks at the accounts on his books he realizes that he must be an optimist.

A man's wife can never understand why he should give a repairman 50 cents to fix something when he could do it himself in an afternoon just as well.

The husband may like the plan for the new house as it is, but his wife will never be satisfied with it except as it isn't.

Many a little extravagance has the same effect on your bank account that a nail has on a plaster wall—it always makes a bigger hole than you thought it would.

I'll say this for a bookkeeper: Now and then a stenographer comes down late in the morning and yawning, but a bookkeeper never does. A bookkeeper doesn't show up at all.

New Catalogs of Interest to the Trade

United Chemical Closet.—United Engine Company, Lansing, Mich. Describes, illustrates and gives hints on installing this chemical closet.

The Louden Garage Door Hanger.—Louden Machinery Company, Fairfield, Iowa. Describes and illustrates a type of sliding door hanger especially suitable for the small garage.

Mende's Nalecode.—Paul Mende, 415 Lexington Avenue, New York City. Describes a nailing base for floors, roofs and partitions. Also it is said to be adapted as a plaster for walls and solid partitions, being an insulator and preventing condensation.

Hydro-Pneumatic Pumps.—F. E. Myers & Bro., Ashland, Ohio. Illustrations and specifications of various kinds of water supply systems, together with the apparatus for successful operation.

Steel Animal Pens.—Louden Machinery Company, Fairfield, Iowa. Gives miscellaneous information concerning pens, and illustrates and describes various types manufactured by this company.

"Globe" Ventilators.—The Globe Ventilator Co., 205 River Street, Troy, N. Y. Illustrates various buildings in which these ventilators have been installed.

The Boy's Own Builder.—Arkansas Soft Pine Bureau, Little Rock, Ark. Working drawings and descriptions of ice boat, row boat, sled, spring board, book case, table, swing, birdhouse, pigeon house, dove house, garden benches etc.

Reproductions of Concrete and Composition Marbles, Granites, etc.—Art Stone Company, Box 500, Waynesboro, Pa. Reproductions in color of concrete and composition marbles, granites, etc., manufactured by the formulas, processes and methods sold by this company.

Save Labor! Increase Speed!—The American Cement Machine Co., Keokuk, Iowa. Folder describing and illustrating Boss concrete mixers and builders' hoists.

The Dutch Boy Painter—National Lead Co., New York City. Monthly magazine devoted to painting, and Vol. XI, No. 1, contains the first of an interesting series of articles on "House Painting."

Shinn-Flat System of Lightning Protection.—W. C. Shinn Mfg. Co., 53 West Jackson Boulevard, Chicago, Ill. Booklet illustrated in colors and describing the operation of the Shinn-Flat System for protecting buildings from damage by lightning, together with interesting information concerning lightning.

Drawing Boards.—American Drafting Furniture Co., Rochester, N. Y. Describes and illustrates various types of drawing tables and drawing boards.

A Technical Handbook on Expanded Metal Lath.—The Berger Mfg. Company, Canton, Ohio. Valuable booklet giving information concerning metal lath and how to apply it. Illustrated by line drawings showing details of construction for plaster and stucco.

Presto Holder.—National Company, 275 Congress Street, Boston, Mass. Folder illustrating and describing a holder for blue prints, drawings, etc.

The Evanston Sound-Proof Door.—Irving Hamlin, 716 University Place, Evanston, Ill. Folder, illustrating and describing a patented sound-proof door.

Evans "Almetl" Fire Doors and Shutters and "Star" Ventilators.—Merchant & Evans Company, Philadelphia, Pa. Catalog illustrating and describing fire doors, etc., together with line cuts showing manner of hanging and construction.

For the Home Beautiful.—The Heppes-Nelson Roofing Co., Dept. D, Marshall Street, N. E., Minneapolis, Minn. Folder illustrating and describing Flexatile shingles.

Walter Concretile.—Walter Concrete Machinery Company, Saks Building, Indianapolis, Ind. Booklet, illustrating and describing the manufacturing of concretile by machines furnished by this company. Drawings showing application of roofing.

Any of these catalogs will be furnished by the manufacturers. Or, if you prefer, we will see that you receive any that you desire. Just check the catalogs you want, tear out the page, and mail it to Building Age, 243 West 39th Street, New York.

Concrete for Industrial Housing.—Portland Cement Association, 111 West Washington Street, Chicago, Ill. Booklet, illustrating and describing various types of industrial houses built of concrete, together with information concerning the using of this material for this purpose.

Cornell Blue Book.—Cornell Wood Products Company, Chicago, Ill. Booklet, illustrating Cornell woodboard, giving manner of application, blue print page of summer cottage, etc.

Knickerbocker Komments.—Knickerbocker Portland Cement Co., 30 East 42nd Street, New York City. A monthly magazine. The March issue contains some interesting little information in a light vein concerning cement, and topics of interest to the trade.

Concrete Septic Tanks.—Portland Cement Association, 111 West Washington Street, Chicago, Ill. Booklet illustrating and describing construction of concrete septic tanks.

Community Homes Built with Steel Forms.—The Hydraulic Pressed Steel Company, Cleveland, Ohio. Handsomely illustrated booklet describing concrete houses built by steel forms manufactured by this company. Houses and their floor plans are illustrated.

Sedgwick Dumbwaiters and Elevators, Catalogue M.—Sedgwick Machine Works, 128 Liberty Street, New York City. Catalog, illustrating and describing various types of dumbwaiters and elevators manufactured by this company. Interesting information concerning the various types.

The Doody System of Vapor Heating.—The Doody Vapor Heating Co., Inc., Boston, Mass. Description of this system and illustrations of various buildings in which this system has been used.

"Fisklock-Tapestry" Brick.—Fiske & Co., Inc., 40 West 32nd Street, New York City. Catalog No. 33-A, illustrating and describing manner of construction with this type of brick. Line drawings and photographic reproductions comprise the illustrations.

McCray Refrigerators for Grocers, Catalog No. 71.—McCray Refrigerator Company, 864 Lake Street, Kendallville, Ind. Illustrates and describes various types of refrigerators suited for grocers, together with general description of construction.

Refrigerators for Residences, Catalog No. 93.—McCray Refrigerator Co., 864 Lake Street, Kendallville, Ind. Describes and illustrates various types of refrigerators for residence.

Refrigerators and Cooling Rooms for Hotels, Restaurants, Clubs, Hospitals, Institutions and Colleges, Catalog No. 51.—McCray Refrigerator Co., 864 Lake Street, Kendallville, Ind. Describes and illustrates various types of refrigerators for these types of building.

Market Coolers and Refrigerators, Catalog No. 62.—McCray Refrigerator Company, 864 Lake Street, Kendallville, Ind. Describes and illustrates coolers for meat markets.

Speakman Showers.—Speakman Supply & Pipe Co., Wilmington, Del. Illustrates and describes various types of shower baths. Contains pictures of numerous buildings in which these showers have been installed.

Speakman Showers and Fixtures, Catalog G-W.—Speakman Supply & Pipe Co., Wilmington, Del. Describes and illustrates various types of shower fixtures, together with interesting details of roughing-in measures.

Golco Sanitary Equipment.—Golco Sanitary System, Inc., 639 Arch Street, Philadelphia, Pa. Booklet illustrating and describing sanitary porcelain toilet paper fixtures.

Monolithic Concrete Silos for Your Farm.—Portland Cement Association, 111 West Washington Street, Chicago, Ill. Describes and illustrates various types of concrete silos.

BUILDING AGE
New York, June, 1918

An Attractive Shingled Bungalow Built at Cranford, New Jersey

THE one-story dwelling for all year round use is rapidly increasing in popularity in the eastern section of the country. The placing of rooms all on the one floor is a step-saving convenience that seems to carry particular appeal to the housewife.

Bungalows intended for all year round use present slightly different problems in design from their summer brethren. Free circulation of air must not be obtained at the sacrifice of winter comfort. The plan must admit of a certain degree of formality not always essential to the summer bungalow.

Residence of Mr. Louis H. Hurley at Cranford, N. J.

An interesting plan, well adopted to living conditions in the East, is that of the Hurley residence. A good sized living room, the main feature of which is a brick fireplace, is entered from the outside directly from a porch. The arrangement of this entrance is particularly interesting, as it is so situated that the prevailing winds of the locality do not blow against it, and there is therefore little danger of the living room being suddenly chilled off when the door is opened in winter weather.

The Colonnade Separating Dining and Living Room, Looking Through Into the Dining Room

The living room communicates with the dining room through a colonnade, which is well in keeping with the simple design of the interior. In the illustrations of these two rooms, it will be noted that the house was as yet unfinished at the time the photographs were taken, the owners just having moved in while awaiting the completion of the dwelling.

A den or porch, provided with plenty of window space, affords a pleasant summer addition to the house, and permits an excellent view of the street.

The bed rooms are well separated from the rest of the house. As the doors of the bed rooms and bath room are usually left open, the hall is kept well lighted. A door communicating with the living room is kept closed, and this shuts off the sleeping portion of the house in an efficient manner. Each bedroom is provided with a large closet.

The kitchen is furnished with a sink that is placed at a height of 36 in., thus obviating any necessity for stooping over on the part of the housewife. The placing of a high sink such as this is a detail that proves efficiency is not understood as well as it might be, and it is only rarely to be met with, even in new and otherwise up-to-date houses. A cupboard is placed handy to the sink. Cooking is done upon a gas range.

The kitchen communicates with the exterior through an entry, which contains the refrigerator.

A flight of stairs leads up to an open attic, which is large enough to admit

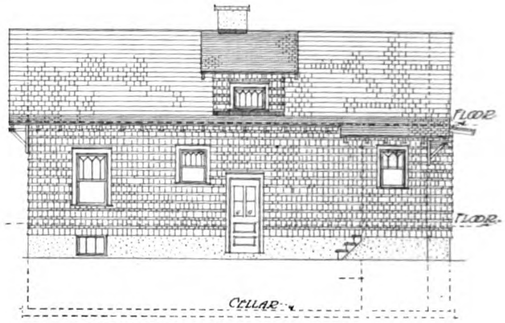
Rear of the House

The Living Room, Looking Toward the Front Door

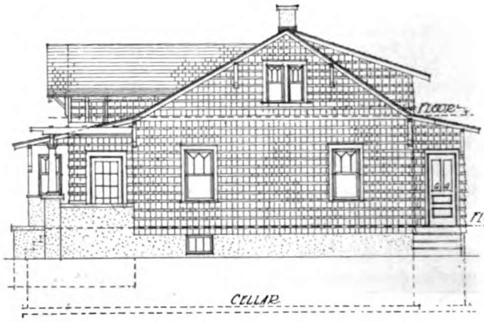
of the placing of two good sized bed rooms, merely by the running up of partitions.

The cellar is spacious and adequately lighted. The section at the front of the house is walled off, and earth placed in, thus affording a place for the starting of vegetables or the growing of mushrooms.

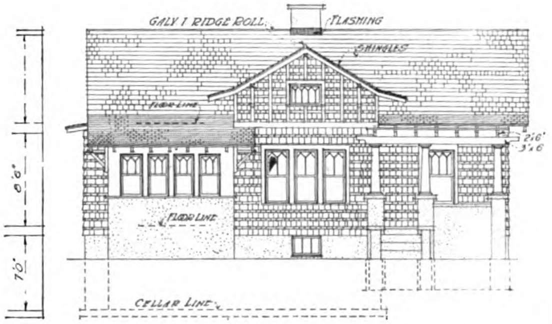
The exterior of the house is exceptionally well proportioned, and the combination of materials is very pleasing. The shingles are laid with alternating wide and narrow courses, obtaining an interesting effect. The cellar walls are of concrete covered with stucco. The English half timber effect in the gable and the front of the house lends a pleas-



Rear Elevation, Scale 1/16″ = 1 ft.



Right Side Elevation, Scale 1/16″ = 1 ft.



Front Elevation, Scale 1/16″ = 1 ft.

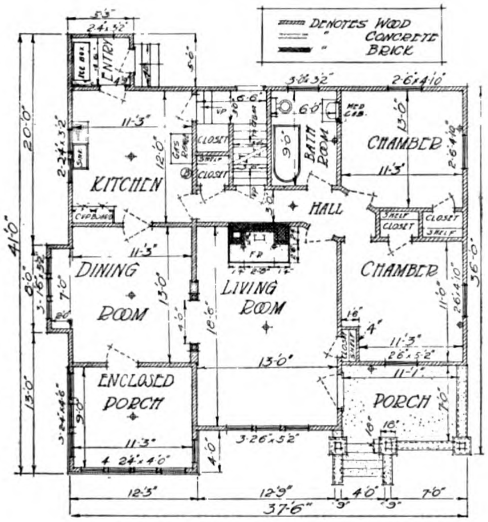
Left Side Elevation, Scale 1/16″ = 1 ft.

The Living Room, Looking Toward the Fireplace and Entrance to Bedrooms

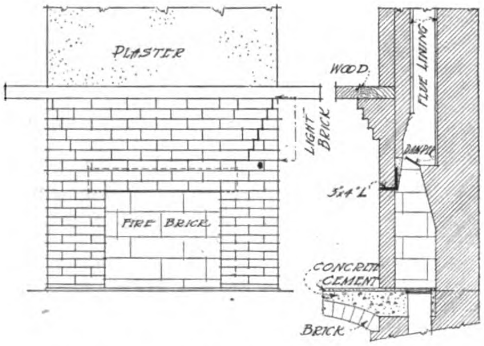
ing emphasis to the design, enhanced by the breaking at the eaves of the dormer roof.

The pergola entrance porch, with its tapered square columns, is enough out of the ordinary to attract attention.

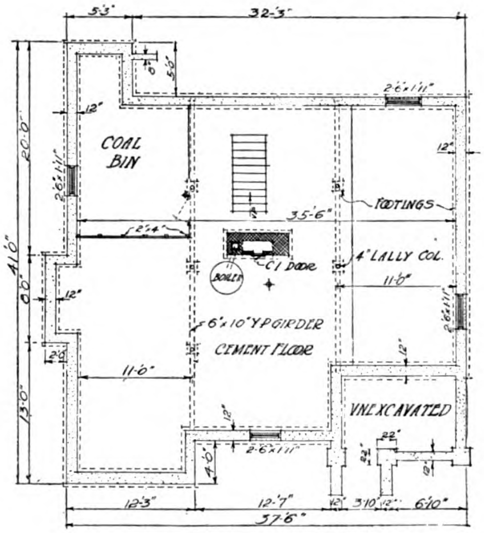
This residence was constructed at Cranford, N. J. The plan is that of the owner, and is a modification of a house built by a friend. The residence is owned by Louis H. Hurley, 248 North Avenue West, Cranford, N. J.



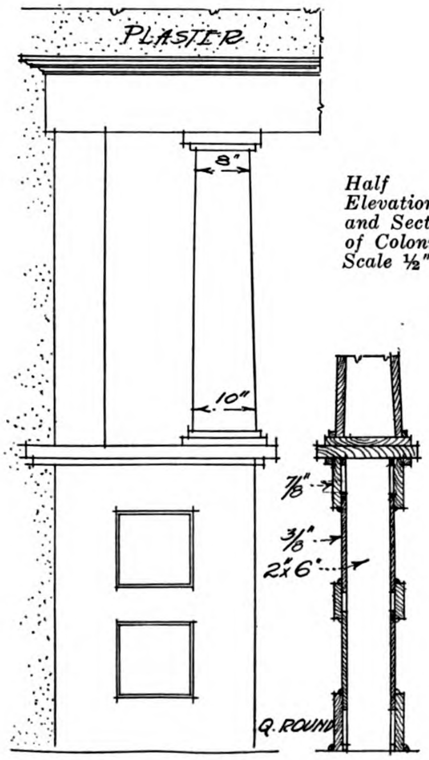
Main Floor Plan, Scale 1/16" = 1 ft.



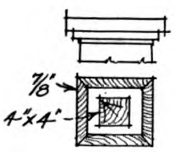
Elevation and Section of Fireplace, Scale ¼" = 1 ft.



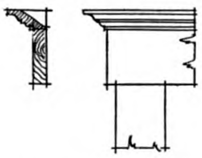
Basement Plan, Scale 1/16" = 1 ft.



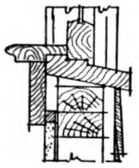
Half Elevation and Section of Colonnade Scale ½" = 1 ft.



Elevation and Section of Porch Column, Scale ½" = 1 ft.



Elevation and Section of Window and Door Trim, Scale ½" = 1 ft.



Section of Window Sill, Scale ½" = 1 ft.

Framing Joints in Wooden Members to Withstand Compressive, Tensile, and Transverse Stresses

Fig. 8—A Good Joint for a Short Post

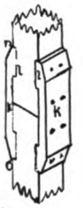


Fig. 9—Cheaper Joint than Fig. 8

By Ernest Drah

In framing joints that are to withstand compression, tension, or transverse stresses, it is often necessary to cut the joining timbers so that they will present a neat appearance, as well as possess adequate strength. The joints should be so designed as to be self-supporting by the proportioning and arrangement of their joining surfaces, which is the primary consideration. They can then be made additionally secure by iron or wood fish plates, bolts, or hardwood keys.

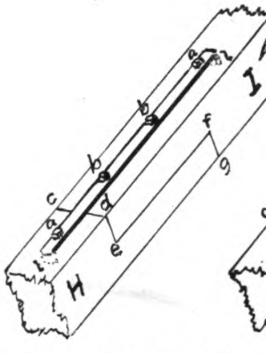


Fig. 1—A Joint that Will Resist Compressive Stresses

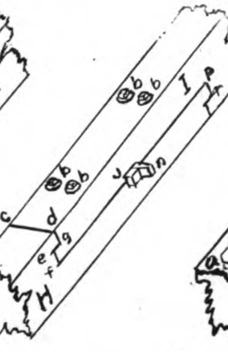


Fig. 2—Stands Compression and Tension, But is Better Suited to Compression

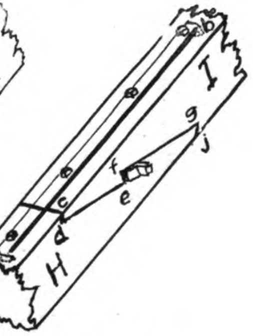


Fig. 3—Will Resist Tension and Can Be Used as a Tie Beam

Fig. 1 shows a joint well adapted to resist compressive stress. The bearing surfaces, *d e* and *f g*, is equal to the entire cross sectional area of the timbers. The iron strap, *a b a*, acts as a reinforcement and strengthens the joint by preventing the timber from bending or buckling in the direction of its depth. The ends of the strap, *l l*, are turned over and let into the wood. Bolts *b b* extend through the two timbers, the lugs *a a* merely serving to secure the ends of the strap. The iron strap has a length twice that of the joint *e l*, and has a breadth one-third that of the timber. It is proportioned in thickness according to the strain likely to be applied. The iron strap also allows the joint to withstand tension, although the joint is not as well suited for tensile stresses as the joint shown in Fig. 2. The bolts are proportioned according to the shearing value of the wood. This joint should be carefully watched and the bolts tightened up as the wood shrinks and seasons, as is the case with all wood joints fastened with bolts.

Fig. 2 is suitable for withstanding both compression and tension, although better suited to compressive strain. In compression the surface *d g*, *e f* and *p r* afford the two timbers their entire possible bearing surface. The wedge-shaped hardwood keys, *j* and *n*, are fitted in position, the depth of the pole, *j n*, being about one-sixth that of the timber, and its length twice the depth. The wedges had best not fill the full depth of the holes, which will avoid the wedges loosening the joint if they do not shrink as much as the main timbers. The distance *f j* of timber *H* is made about 1/16-in. or ⅛-in. greater than the distance *f j* on timber *I*. Four bolts, *b*, extend through the two timbers. There is a tendency for the bolts to work loose as the timbers shrink, and they require tightening up from time to time until the wood is well seasoned. Washers are put under the nuts.

Fig. 3 shows a joint which may be used where tension is to be resisted, as in a tie beam. The lines *c d* and *g j* are cut at right angles to the lines *d c* and *f g*, as also is *f e*. The shoulders *c d* and *e f* should be each at least one-sixth of the total depth of the timber. The iron strap, *a b*, is twice as long as the length of the joint; its breadth is one-third that of the beam and its thickness is proportioned according to the tensile stress present. The ends of the strap, *a* and *b*, are let into the timbers as shown. Hardwood wedges or keys are inserted at *o* and *l*. This joint is not suited to compression, as there is a tendency for the oblique surfaces to rupture.

Fig. 4 shows a joint adapted to a transverse bending strain, as in a floor joist. When a beam is loaded its upper part is in compression and the lower part in tension; this joint is designed to withstand these stresses. The shoulder *a b* is cut one-third the depth of the joist, taking up the compressive stress. The length of the scarf, *b c d*, is equal to about three or four times the depth of the beam. An iron strap takes up the tensile stress on the bottom of the beam. Bolts tie the various members together.

The joint shown in Fig. 5 is similar to that shown in Fig. 3, but is more reliable under cross strain, tending to bend it in the direction of its width. The pointed toe, *g j c*, also helps it to withstand a cross stress. This joint is well suited for a position requiring ability to withstand tensile and cross strains. It can be adapted to withstand a transverse strain by cutting *c d* at right angles to the length of the beam *H I*, exactly as in Fig. 4.

Fig. 6 shows how a tie beam can be spliced so as to withstand both transverse and tensile stresses. This joint is useful when preparing a long wooden chord of a roof truss. The length of the scarf is about four times the depth of the beam.

Fig. 7 shows a method of lengthening timber while providing considerable ability in withstanding longitudinal and transverse stresses. Three thicknesses of timber are bolted together. If the

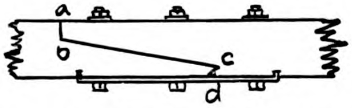


Fig. 4—Is Suited to Withstand Transverse or Bending Strains

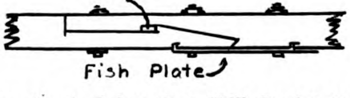


Fig. 6—A Joint that Will Resist Both Transverse and Tensile Stresses

timbers are over 6 in. deep two bolts in the depth are used.

In joints like those shown in Fig. 1, 2, 3 and 5, the length of the joint is three or four times the depth of the timber if pine or spruce is used; when oak, hard pine, or elm is used the length of the joint need only be twice the depth of the timber.

Fig. 8 shows a good joint for a short post. Holes are cut at *a* and *b*, which are at least two-thirds of the depth of the post away from the squared ends. A bolt is inserted in a hole bored for the purpose, and nuts at *n* and *o* screwed down tight. This brings the bearing surfaces of the timbers in close contact.

Fig 9 illustrates a cheaper joint than shown in Fig. 8, suitable for a short post. Side pieces or fish plates *k*, *k* are let into the posts, and nailed with 8 to 12 spikes, or they can be bolted. The pieces *K* should be equal in thickness to at least one-quarter the depth of the timber, and the indents *l l* not more than one-third the thickness of the fish plates, *k*. The length of the joint, *n* to *o*, is about three times the total depth of the timber.

Fig. 10 shows another form of joint for a post. Iron straps, *i i*, are let into the timber, being sunk flush. They are equal in width to at least one-sixteenth the thickness of the timber. The dowel *d* can be of iron or hardwood, and keeps the two timbers in alignment. The iron straps are either fastened with lag screw or spiked.

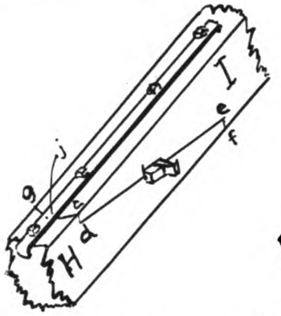


Fig. 5—Will Resist Tension Like Fig. 3, But is More Reliable Under Bending Strains

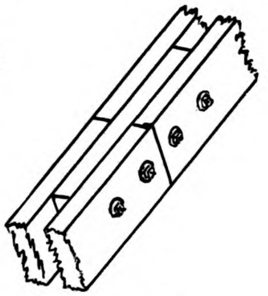


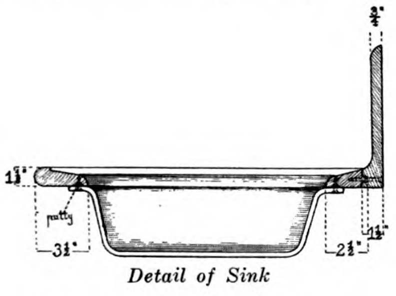
Fig. 7—A Method of Lengthening Timber When It Is Necessary for Longitudinal and Transverse Stresses to Be Withstood

Fig. 10—A Form of Joint for a Post

Constructing a Sanitary Drainboard and Sink

By Henry Simon

THE manner of putting together a wooden drainboard, splashboard and sink is well established. Equally well established is the fact that the combination thus obtained is thoroughly unsatisfactory. It is a foregone conclusion that after a sink has been set up this way, it will be only a little while before trouble sets in. The putty that is supposed to keep the water from getting into the crack between the sink and the board begins to get loose and crumble, the board starts to get water-soaked all around the edges, black spots begin to appear and spread rapidly, and finally rot sets in.

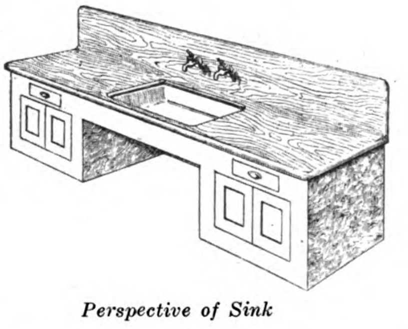


Detail of Sink

Careful workmanship will help to delay the coming of the trouble, and so will scrupulous care on the part of the housewife. But neither will avail for any length of time, for the simple reason that the entire principle involved in the construction is faulty, makeshift and, as the slang term puts it, "full of holes."

The sink combination shown in the accompanying drawings is based on a totally different principle, which overcomes entirely the inherent faults of the old construction. A sink put up in this manner is practically one solid unit. It is entirely water-tight at the seams and will stay so indefinitely. It does away with sharp edges and corners and offers absolutely no chance for water or dirt to get in anywhere. It substitutes for the angular, hard-to-clean construction of the old way, easy curves and rounded corners which blend perfectly with the body of the enameled sink and are as easy to clean as the latter, besides having a far superior appearance. It costs more to install, but pays several hundred per cent dividends annually on work saved and on trouble, repairs and depreciation avoided.

The drainboard itself is beveled off from all four sides toward the opening in the usual manner, though it differs from the usual construction in that the front edge and the edge of the opening are not merely beveled off, but are rounded in perfect curves. The formation of the edges of the opening is particularly important, and still more so is the size and shape of the latter. These should be such that when the board is placed on the sink the bottom edge of the board will coincide exactly, all the way around, with the line on the sink where it begins to curve downward. Careful measuring and accurate work are here required. The fitting of the sink against the bottom of the board is equally important. The enamel is usually not quite regular, and to get a nice fit it is necessary to scribe the board to the sink. This is best accomplished by means of a narrow scraper about ¾ in. wide—a tool, by the way, which any carpenter will find very useful also for other work. Its small cutting edge permits great force to be exerted and narrow, shallow and irregular depressions to be easily and quickly worked out. When the fitting is finished, a shallow groove ¼ in. wide should be cut all around the bottom and ¼ in. away from the opening.



Perspective of Sink

The splashboard is milled from 1½-in. stock, the main upper portion being ¾ in. thick and rounded at the top, while the double-thick bottom portion permits that part to be so shaped as to join drainboard and splashboard in one easy

and continuous curve. Otherwise the two boards are connected in the usual way, by a tongue-and-groove joint.

Perhaps the greatest difference from the old established order is the connection between sink and drainboard. Instead of the sink being first set into the frame and the drainboard then nailed to the frame, the sink is here screwed to the drainboard itself. To accomplish this it is necessary to have holes bored all around the rim of the sink and at intervals of not less than 4 in. along the long edges and of 2 in. along the short edges, which will be screwed to the end-grain portions of the board.

In putting together the combination these directions should be observed:

First. Make the drainboard and splashboard some time before it is necessary to assemble them, so that a few days at least, and preferably two or three weeks, may elapse to permit the proper treating.

Second. Fit the splashboard and drainboard together, and see that sink is fitted accurately to drainboard before anything else is done. Bore the holes for the screws, so that it is only necessary to drive the screws in later.

Third. Apply five or six good coats of linseed oil in succession, waiting only for one coat to sink in before the next one is applied. Do not allow each coat to get hard before applying the next, as that would stop more oil from soaking in. Apply the oil not only to the outer surfaces, but all over both boards. It will keep them from absorbing moisture from a steam-filled kitchen atmosphere. Keep on soaking additional oil into the end-grain until it will absolutely not hold any more.

Fourth. Set the boards away to dry as long as possible and then glue them together at the joint, re-enforcing the latter with nails or screws.

Fifth. Make a thin putty of half common putty and half white lead, and place a generous amount into the shallow groove around the bottom edge of the opening. Now screw the sink tightly into place.

The work is now ready to be placed into position. When the oil is perfectly hard the upper surfaces of the boards may be lightly sanded down, and a final coat of oil then be applied and rubbed down with dry rags to make a perfectly smooth finish.

Ship Building for House Carpenters—I

By A. H. Brenzinger

Lack of activity in the building trades is causing many a carpenter and builder to think of turning temporarily to ship carpentry as a means of livelihood.

The small amount of literature upon this subject has proved a deterrent to many. It is the object of this series to afford the house carpenter sufficient knowledge of the subject of shipbuilding to enable him to unhesitatingly enter this field with as much knowledge as can be given him through the medium of the printed word.

The author, Mr. Brenzinger, has volunteered to answer any questions on shipbuilding that readers may care to ask.

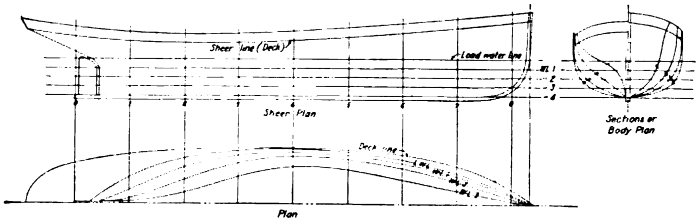
IN these days, with the entire nation bent upon the fulfillment of its shipping program, it is no more than right that the mechanics should try to fit themselves into the part for which they are best qualified. So through this article we desire to reach those of you, especially the house carpenters who want, not only for their own interests but for that of the nation's, to qualify as ship carpenters.

The methods employed in the building of a small vessel being practically the same as those on larger construction, I have selected a 100-foot tug for this article.

I take for granted that you are a first-class carpenter, for then, with a little study and of course with a little practice, you will soon become a good ship carpenter.

You will have to become acquainted with ship terms and the names of the different parts of the wonderful structure of a ship.

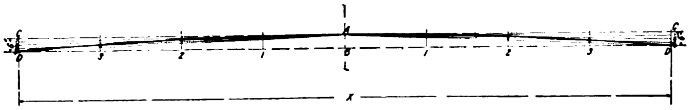
On the accompanying drawings I have labeled all parts plainly and with a little study of these plans you will be able to go aboard a ship and pick out and name the various parts.



Lines for 100-ft. Tug

The tools used are much the same as the ones you are familiar with, except that the broad axe and the adz play an important part in ship building. The use of these tools by the ordinary carpenter is a lost art and your success in ship work depends greatly on your ability to use them, especially the adz.

The mould loft, as the name implies, is the loft on the floor of which are laid down, full size, the ship's lines. You will have to, in a general way, understand what ship's lines are and how they are obtained, for here in the mould loft is the beginning of practically all your work.



Method for Laying Off Beam Crown

The accompanying drawing of the "Lines for 100-ft. tug" will give you an idea of what lines are and why you need them.

To build a house you must have a set of plans, showing the shape of the house; that is, its length, width and height, in other words three projections. In the line draught you have the corresponding projections—sheer plan, plan, and cross sections. In house construction you work to straight lines and square corners, but in ship work you will find few straight lines and no corners.

The keel is the main member of the ship and together with the keelson forms the backbone of the structure.

The true lengths for keel and keelsons are obtained from the loft floor, also the rabbet lines, although a drawing is usually supplied by the draughting room showing the location of scarfs, details, etc.

For the stem, stern post, and rudder post, moulds or templates are made from the floor, locating all details on them.

After the keel is laid on the keel blocks prepared for it, it is lined up and bolted together. Of course while the keel is being prepared other parts are being prepared also, so when the setting up begins the procedure is not necessarily the one here described.

The stem when completed is set up and fastened to the keel and then the apron is put on. All this requires skill-

ful laying off and fitting. Remember accuracy in ship work is all important.

The stern post, rudder post, horn timbers, deadwood, and shaft log are all placed as soon as they are shaped and all bolted securely together.

From the full-sized body plan on the loft floor, moulds for each frame, or ribs as the landlubber calls them, are made. Frames for small boats are steamed and bent to shape, but of course this can't be done in larger vessels. So they are built up as shown on midship section. The short pieces that make up the frame, A, B, C, D, etc., are called futtocks and the piece that runs across the keel tying the port and starboard frame together is called the floor timber. The mould for each frame will be the actual shape of the outside edge and the inside edge of the frame. On it will be marked at various places along the edges, both the inside and outside, the varying bevels expressed in degrees. The frame must be beveled inside and outside so that the planking and ceiling will lay snug against it.

The mould need not be made in one piece but can be made in several parts to facilitate handling. The butts of the futtocks are marked on the mould and if it is made up of several parts the joint is made at one of these marks. The futtocks are figured out to suit the size of timber on hand. In figuring on the length don't forget to allow for bevels. After selecting the timber the mould is laid on it and all marks transferred to the timber. This is then sent to the saw mill, where it is cut to shape and beveled, all at one operation on a tilting band saw. The various futtocks are then assembled on the setting up platform, usually placed under the stem. They are fastened with tree-nails, pronounced trunnels, which are locust dowels, in this case about ⅞ inch diameter. The frame after assembling is hoisted to its proper place and fastened to the keel with through bolts. This operation is gone through for each frame. They are held in place by temporary wooden "ribbons," which are strips of wood of substantial thickness bolted to the frames fore and aft. When the frames are all in place they are faired up with the adz. This operation is called dubbing. Battens are run fore and aft to test the fairness of the frames.

The keelson is then laid and bolted through the floor timbers and keel with through countersunk bolts. The engine and boiler beds are similarly laid. Drawings are usually furnished for these details, showing bolting arrangement, etc.

Next the bilge stringers are put in, which in most cases must be steamed before springing into place. They are bolted to the frames with through countersunk bolts.

The clamp timbers are similarly put on, and the ceiling or inside planking is ready to go on.

The ceiling of a vessel is in no way similar to a house ceiling. It is the inside planking and its main purpose is to keep the cargo from pushing out the outside planking. It also is of great value as affording additional strength, and when it is calked as is done in many cases, it means added watertightness, which is a very good feature these days.

The deck beams having previously been cut to shape, are now put in place.

A method for laying out the crown, or camber of a beam is shown in the accompanying drawing.

Lay off X, equal to the greatest width, or as it is called, the beam of the ship. At the center B, erect a perpendicular and make A-B equal to the required crown of the beam, in this case six inches. Draw the line C A C parallel to D B D, then divide C D into equal parts. Divide B D into the same number of equal parts as C D is divided into. From these points erect perpendiculars; now from the center point A draw a line to the first point down on C D; where this line intersects the first perpendicular, is the first point in the crown line. Then again from A to the second point down on C D draw a line and where this intersects the second perpendicular is the second point on the crown line, and so on down until all intersections have been made. Bend a batten through these points and draw the crown line. Cut a mould to this line and you will have a beam mould to be used for all the deck beams in the vessel.

After the deck beams are in place, the shelf timbers are sprung in, and the stanchions, house sill, coamings and beam knees fitted.

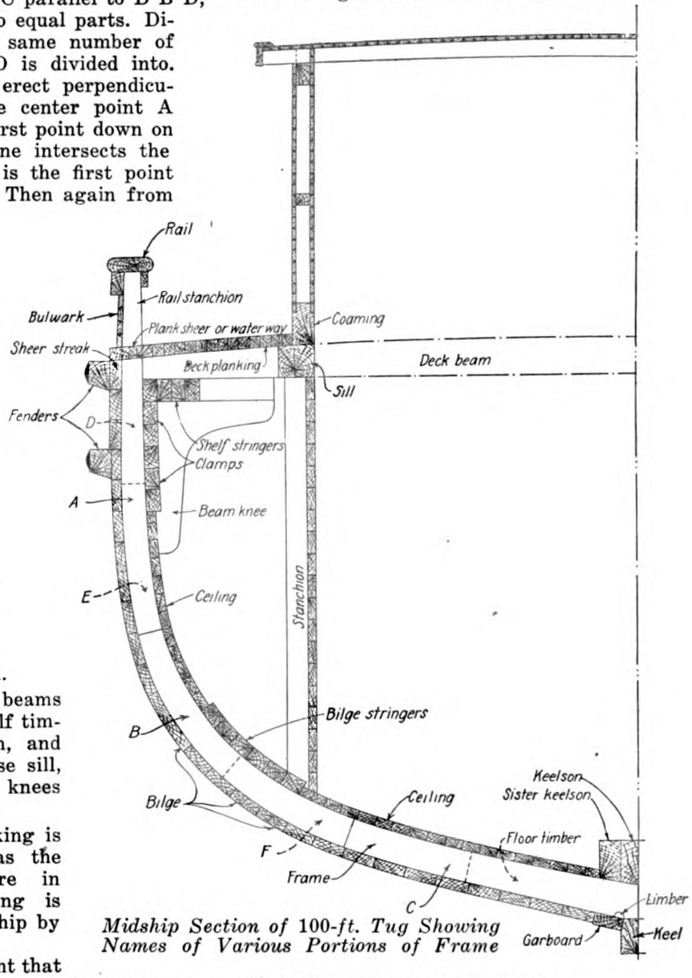
The outside planking is started as soon as the stringers, etc., are in place. The planking is "lined off" on the ship by experienced men.

It is very important that the planking should be neatly put on, as not only does the watertightness of the vessel depend on this but a poor job on the planking would condemn any vessel.

The first plank to be put on is the garboard, which is the first plank next to the keel. It is a very difficult job to fit this, as you will soon find, should you take up ship work.

The sheel streak, which is the first plank on the line of the deck and following the sheer of the ship, is usually the second plank to go on. The planking is then worked down from the sheer streak and up from the garboard. The last plank in, usually at the turn of the bilge, is called the shutter. The garboard, bilge planks and sheer streak are usually made somewhat heavier than the rest of the planking. The shapes for the planking are taken from the ship. A lot of the planking will have to be steamed to be sprung into place. The planking is fastened to the frames with treenails and spikes. After the planking is on it is calked and planed smooth, to make a fair surface. On a good job wood plugs are fitted over the spike heads and on deck planking this is always done.

The outside plank of the deck is called the covering board or waterway plank. This plank follows the shape of the deck and the ends of the other planks that run out against it are let into it in order to prevent shim points.



Midship Section of 100-ft. Tug Showing Names of Various Portions of Frame

The rail is fitted to the top of the rail stanchions, which are really the last futtock on the frames, run up through the deck. The outside planking on these above the deck is known as the bulwark. The fenders are fastened with through bolts, through the planking and frames.

The deck houses are usually built by ship joiners, which is in itself a trade, so we won't go into the details here. The ship carpenter's work goes as far as the house coamings.

I've tried, in this article, to give you in simple language the general process of ship construction, and in following articles I will endeavor to give more in detail the various steps here described.

(To be continued.)

Some Echoes of the Noon Hour—X

The Gang Gets Some Practical Dope on How to Apply For and Secure a Job

By Edward H. Crussell

"Disregard 'No Admittance' Signs. If There is Any Real Reason Why You Should be Kept Out, Somebody Will Stop You Before You Get Into Mischief"

THE gang, arranged in picturesque and relaxed attitudes on the shady side of the house, had finished lunch and (with the exception of the Kid, who was busy with a blue chalk caricature of Old George) were taking a well-earned rest. The day had seemed too warm for discussion or argument, consequently when a stranger appeared and, after looking them over, remarked, "Good-day, gentlemen. Where can I find the foreman?" each one waited for his neighbor to speak.

After a short but disconcerting pause, Bliss asked: "What do you want with the foreman?"

"Are you the foreman?" inquired the stranger mildly.

"No," was the laconic reply, and Bliss settled back with the air of one who had lost all interest in the matter.

"Pardon me," said the stranger, smiling, "I didn't mean it that way. I haven't anything to sell and there is no great secret about my business with the foreman. I'm looking for a job and I really thought you were the foreman. You look——"

"Oh, that's all right," interrupted Bliss, with a grin, as the others started laughing. "Never mind the salve. The foreman's gone downtown. He'll be back about one o'clock or a little after."

"Thank you," said the other and, after a slight pause, limped off around the corner of the building.

"I bet the Old Man'll give him a job, too," said Shorty, "and I know what kind of a job it'll be—to look for another one."

"Well, he's a polite son of a gun, anyway," said Scotty, "and I sure do admire the way he made Bliss take notice. He didn't make such a bad guess either, seeing that Bliss is our only executive when the Old Man is away."

From this point it was perhaps natural that the talk should drift around to the subject of looking for work, and the proper deportment and attitude of the seeker.

The consensus of opinion appeared to favor the idea that all which could be required of a free-born citizen was that he should merely walk up and ask for the job in plain English. To this, however, Scotty suggested that something more should be added.

"The fellow who could give us the best information on the subject," said he, "is the Old Man, who is, unfortunately, absent. It shouldn't be a difficult thing for anyone to get work at the present day, but I've seen the time when it took as much skill to land a job as it did to hold it after it was landed—sometimes more. Skill of a different kind, of course, and I've often wondered why these people who are so busy founding and promoting correspondence schools of all kinds have never introduced some such course as 'How to apply for a job.' You have only to give the matter a little thought to realize how badly some such source of information is needed. Dozens of workmen are in the wrong job, and in some cases have held the wrong job for ten or twenty years, simply because they were and are afraid to make a change or ask for another job where they are not known.

"Men of this stamp, if they ever lose their job, have no business-like idea of the best method or, indeed, of any method of obtaining a new one. They either get some friend of a friend of theirs to ask the foreman to give them a show, or else they sit down and wait for the job to come to them, until some acquaintance or neighbor, out of pity for the other members of the family, goes out and hunts them up a new position."

"Well," considered Old George, "I don't know if I belong in the class to which you refer, Scotty; perhaps I do. I've been with this firm over sixteen years and I'm willing to admit that I should hate, even at the present time, to go out looking for a new job; but I don't think it's because I wouldn't know how to ask for one, and I don't think that any correspondence course would help me in the matter."

"My remarks had no reference to you, George, and quite well you know it," was the reply. "You're merely trying to start an argument. There has been plenty of chance, in the past sixteen years, for a fellow to lose his job in the building trades, and those who have avoided doing so are more to be envied than pitied."

"For my part," broke in the Kid, "I'd just as leave you'd quit your moralizing and tell us some of the things you think

"When You Need a Job Get Up Early in the Morning and Go Every Place Where There is the Slightest Chance of Woodwork Being Done"

ought to be done by a fellow applying for a job. The experience of one who has asked for work in half the countries of the world and every State in the Union, as you seem to have done, ought to be worth listening to."

"Yes, I could probably make the experiences interesting enough," began Scotty, "but the different countries don't have much to do with the method used, excepting for the fact that you are a long way from home and friends and must depend upon your own resources.

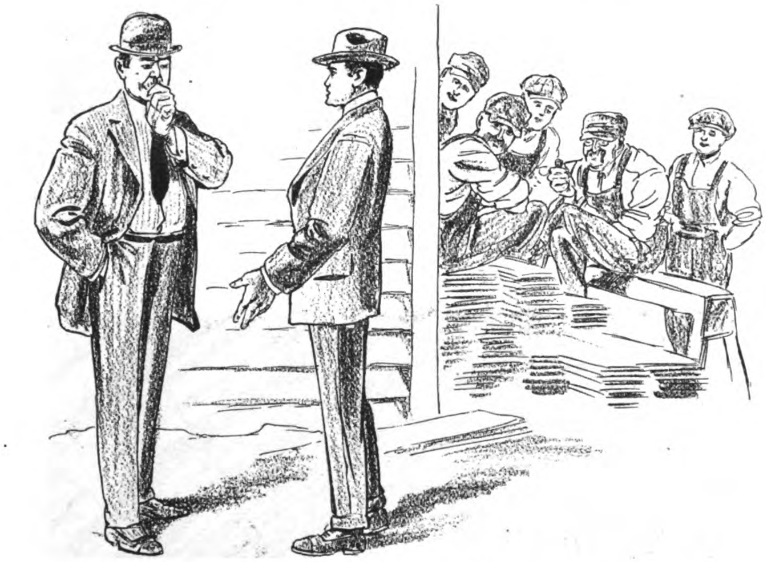
"There is a saying to the effect that 'We judge ourselves by what we know we can do; others judge us by what we have already done.' It's well to bear this in mind, especially when you go looking for work. That fellow who was here just now said he had nothing to sell. He made a mistake. Everyone looking for a job is trying to sell his services and ought to go at the matter with that idea in mind. How many books, magazines or aluminum cooking sets do you suppose would be bought at the door if the pedlars opened up the subject with 'How's chances to sell you a book?' or 'Want to buy a kettle?' And yet most men go at the all-important business of getting work with just that kind of a question: 'How's chances for a job?' or 'Hiring any help to-day?' "

"I can only indorse the Kid's remark," interrupted Shorty. "Either quit your preaching and say something, or shut up and let me go back to sleep."

"From the way the congregation is squirming in its seat," chuckled Scotty, "it would seem as if some of my preaching was hitting the mark. However, I'll tell you my method and, although I don't pretend to say that it or any other method will apply in all cases, you may find something in it worth considering. By it I claim that I can get a job any working day in the year, and in the course of a somewhat varied experience I've only known it to fail once. The method is based upon the assumption that someone in town needs a carpenter, and the idea is to take the town systematically, one street after another, and apply at every place where a carpenter could possibly be used. Every mill, factory, large store, warehouse, new building—in fact, as I've just said, *anywhere there is the slightest chance of woodwork being done.* You must get up early in the morning, shave (if you need a haircut get it the day before), brush your clothes, polish your shoes and start out with the determination that you will have a job before you come home again.

"Disregard all 'No Admittance' and 'Keep Out, This Means You' signs. If there is any real reason why you should not be admitted a watchman or somebody else will stop you before you have a chance to get into any mischief. However, when the sign reads 'Apply at the Office,' it's just as well to try the office first. How you approach your man, once you have him cornered, will depend upon circumstances; but whatever you do, don't start out with a question that merely needs a 'yes' or 'no' for an answer. If you open up with 'Good-day, are you hiring any carpenters?' and he says 'No,' you are up against a stone wall and have no chance to tell him how badly he needs you without first proving him a liar. On the other hand, if you say, 'I see you have some shingling to do. Do you ever let your shingling by contract?' whether he says 'Yes' or 'No' or 'What business is it of yours?' you still have a chance to tell him how good a shingler you are; how badly you need the job; how good you are at other forms of woodwork, and a few little things like that. You'll be able to ask at over a hundred places in the course of a busy day, and times are bad indeed when your chances are not as good as a hundred-to-one shot."

"Especially with a clean shave and a haircut and your shoes polished," commented Shorty. "What particular good are polished shoes to a carpenter? I know there are a lot of them who don't use their heads to any extent, but I didn't think they needed to use their feet for anything but walking on."



The Gang Receives a Practical Demonstration of How to Get a Job

Scotty gazed earnestly at the speaker for a long moment, and then, shaking his head, said soberly: "You remind me, Shorty, of my neighbor's boy, a big, husky young fellow, about twenty-two. He went over to the recruiting station to enlist, but they turned him down. 'What for?' he asked in amazement. 'On account of your teeth,' they told him. 'Your molars are all gone.' 'Holy suffering jawbones, Doc!' said he, or words to that effect. 'I don't expect to go over there to bite those fellows.' "

The foreman approached while they were still chuckling over this idea, but just before he reached them the stranger, who had been waiting on the other side of the building, came up to him and said: "Good-day, sir, are you the foreman on this job?"

The foreman nodded.

"I'd like to get a job with you," said the other. "I'm a carpenter by trade and if you could start me I believe I could give satisfaction."

"Sounds like he was applying by letter," whispered Bliss. "I'll bet he got that out of a book."

"How old are you?" queried the foreman.

"Twenty-five," said the other, in some surprise.

The foreman shook his head and prepared to pass. "We're not hiring anyone of draft age," he said decisively.

"Pardon me," said the other. "but I don't think you noticed. Uncle Sam is very particular about the physical trim of his men. If you can tell me of any branch of the service where they need a fellow with one leg shorter than the other, I'll gladly try there."

"Sorry," apologized the foreman. "I didn't notice." He meditated for a moment, pinching his chin and looking the man over, then said abruptly, "When can you start?"

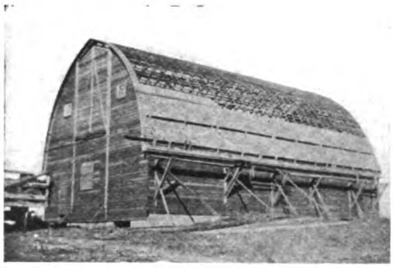
"I came into town to-day from Lincoln," said the other, mentioning a small place about twenty miles away. "My tools are out there yet. I could be here ready to start first thing in the morning."

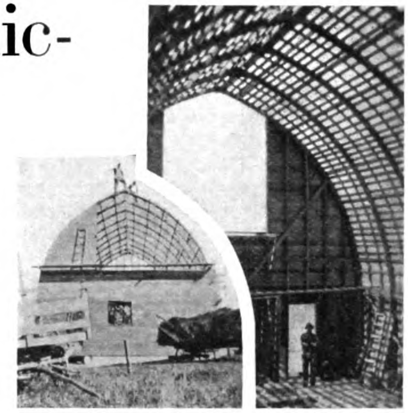
"All right," was the reply, and the two separated, while Scotty said: "What did I tell you? A blooming agriculturist; lands a job with the best firm in town without knowing it, and all because he went about it in the right way."

There was some argument about this, and because of Scotty's remark they spoke of the new man as the agriculturist among themselves for the next few days, then they shortened his name to "Farmer" and accepted him as one of th family.

(*To be continued*)

How Rafters for a Gothic-Roof Barn Were Laid Out





By C. E. Kelly

SINCE my inquiry appeared in the August issue regarding how to build a Gothic-roof barn, I have built a Gothic-roof barn 32 x 54, with 9-ft. concrete basement barn and 8-ft. walls in the loft. I inclose pictures of this barn in various stages of construction.

For the rafters I used six ply of 1 x 4 in. stuff, surfaced one side, with a 1 x 6 on the under side. In the construction of these I used a 10-ft. radius, keeping the point from which I struck the circle on the plate line. This brings the lower end of the rafter square against the plate, giving all thrust a straight downward direction, as is not the case where the circle is struck from a point below the plate, as I have seen it done.

Interior Framing Detail of the Roof

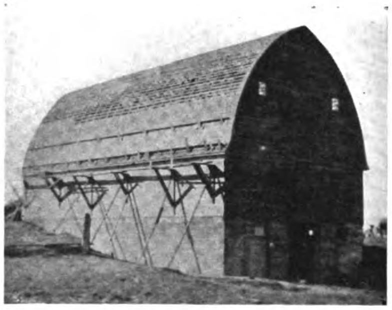
I built the rafters on the loft floor, nailing 2 x 6 in. blocks to the thickness of the completed rafter inside of the circle; 1½ in. (the thickness of two boards) outside of this inner circle I nailed to the floor two blocks (one at each end of the rafter and sprung on a 1 x 6 and a 1 x 4), lapping well, and clinching the nails, which were 6d., or, as they are known here, 2-in. common.

The last two blocks held these two boards to the circle except at the center, where there was a tendency to spring out. Here I nailed butting against the 1 x 6 and holding some 1-in. pieces. These gave me a face to work to as I sprung the rest of the 1 x 4 in. on.

For this work I found that three men on this length of rafter, 26 ft., could work to best advantage, one bringing boards and springing them on as one man nailed temporarily, and the third man followed these two, nailing all solid.

In cutting the ends of the rafters I ran a line, perpendicular to the plate line, through the peak, and cut here and on the plate line at the bottom. For this purpose I had the blocks in place so I could cut by them as in a miter box. Cutting the ends released the rafter and there was very little binding in the cut.

These rafters I placed on 6-ft. centers, running 2 x 4 purlins between them 3 ft. apart. These purlins were notched to bring the top edge 1½ in. below the face of the rafter when they were resting on the 1 x 6.



The Roof Partially Sheathed

I then sprung on the two 1 x 4 in., as spoken of by John Upton of La Forgeville, N. Y., in his letter in the March issue.

In answer to him I would say that I have been a foreman on a job where the rafters were built of three ply of 1 x 12 hewn to the circle, but they were more expensive both in labor and material, and I do not think they are much stronger.

I have given quite a little detail as

regards the building of these rafters in hopes that I may save someone else some of the time I lost in figuring the best way to get at them.

There are a number of Gothic roofs around here, and I am of the opinion that there will be few more gambrel roofs erected in this vicinity.

I have been watching the Correspondence Department with interest since the insertion of my inquiry and appreciate the answers received. They did not come in time for me to use them on this barn, so I had to work them up for myself, and invite criticism on my methods.

In conclusion, let me say that the BUILDING AGE is the most appreciated of any paper I receive.

A Frame That Is Well Adapted To Large Barns

Hollow tile first floor walls for barns are dry and warm. In Shawver framed barns the siding boards run up and down. This is a "T" shaped general purpose barn with a large hay mow with great capacity.

Constructive Details and Bill of Materials

By W. E. Frudden

THE barn framing design shown here is one that gives the barn builder a stiff plank framed barn with an unobstructed mow that will hold an abundance of hay. It is a plan that is particularly well fitted for use in the larger structures.

These details show a barn thirty-six feet wide. Wider or narrower barn may be built and this same general idea of construction may be followed with success just as hundreds of Corn Belt farmers have done in the past.

The foundations will extend above the grade line at least two feet and in many cases will run as high as the bottoms of the windows, or four feet. The floors are of concrete and built in the usual manner facing the cows either in or out to suit the owners' desires. The ground floor walls above the concrete have 2 in. x 10 in. doubled sills and plates and 2 in. x 10 in. studding placed two feet on centers. Bills are bolted to the concrete every six feet with 18 in. x ¾ in. bolts.

The built-up roof trusses which are shown in the cross section are spaced every fourteen feet along the length of the barn.

The rafters are of 2 in. x 6 in. material on two feet centers. The lower rafters rest on the side wall plate. At the hip the rafters are supported by the heavy purlin plate which is carried by the trusses.

Floor joists are 2 in. x 12 in. and are spaced every two feet. Continuous girders made of 2 in. x 12 in. planks spiked together and supported by columns in the center are spaced twelve feet apart across the barn.

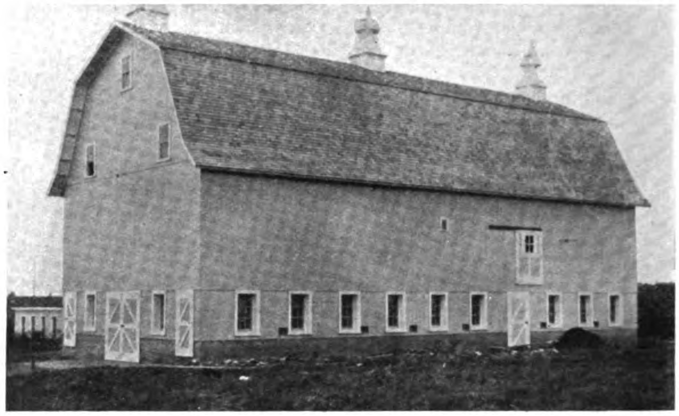
The description which follows gives a general idea as to the barn framing operations in the building of a Shawver barn frame:

The side and end walls above the masonry are built out of 2 in. x 10 in. material. Sills are doubled as well as the plates and anchored to the wall. Studding is doubled around all windows and doors.

The mow floor is carried by the two girders built up four-ply of twelve inch planks so placed that no two end butt joints will come at the same place in the girder when completed. The girders will be set straight and level. The joists are spaced on two foot centers and will butt together over the center girders, being cross bridged in the center of each span as soon as they are set true and plumb.

Cover the mow floor with shiplap flooring and the side walls with vertical barn siding, or ten inch boards and wood or metal battens. The required number of roof trusses for your particular sized barn will then be built up complete on the mow floor, one on top of the other so as to get them all alike. In case some long timbers are required which cannot be obtained at the local lumber dealer, splices must be made secure by cleats on both sides of the joint and then well

Another view of the "T" shaped general purpose barn. Shawver barn framing is well adapted for use in the larger types of structures like this. It is a stiff plank frame but has more lumber in it than the "Plank Frame Barn."



This is a Shawver barn. Standard width (36 ft.) and the details as described in the article titled "Shawver Barn Framing" tell how it is built. The bents are fourteen feet apart. These support the nailing girts on the sides and the purlin plate at the hip to which the rafters are spiked and supported. The King system of ventilation is used

nailed. All joints as shown in the truss are made secure by using half inch bolts.

Every fourteen feet along the length of the barn one of these plank trusses will be raised to an upright position by the use of a gin pole and a block and tackle. As soon as erected, the trusses are braced against wind by fastening the nailing girts and the plates into position as illustrated in the side framing diagram.

The purlin plates run the full length of the barn at the hip and act as a support for the rafters. This plate is built up from two by ten inch planks as shown and securely bolted together, being hoisted into its position with a block and tackle. A two by four inch strip is added as a support for the upper run of rafters.

The rafters are of 2 in. x 6 in. dimension lumber spaced two feet center to center and well spiked to the plates. A 2 in. x 8 in. collar beam is fastened to each rafter as a support for the hay carried track. Lookouts are then added to each rafter, as is shown in the drawings, and the frame work is then completed.

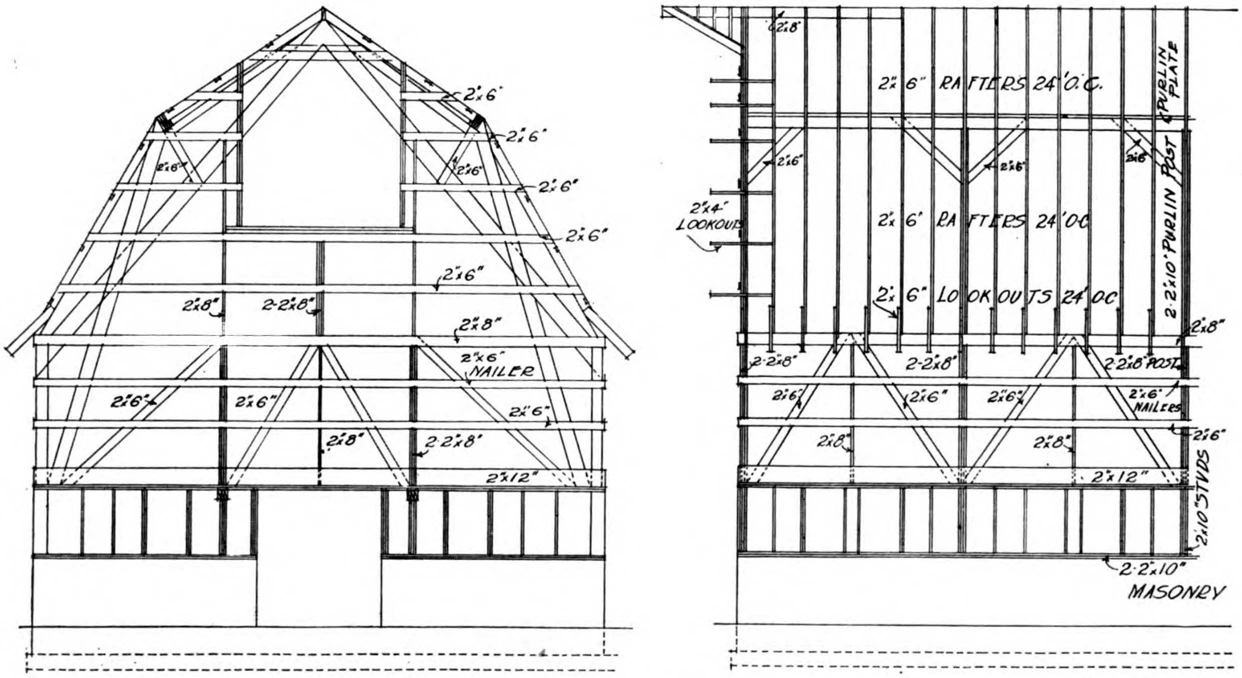
The siding lumber is applied to the nailing girts in a vertical fashion. The roof covering which is commonly used is six inch material spaced three inches apart and covered with cedar shingles laid four and one-half inches to the weather. In some cases the lower rafters, that is the steep roof, laid with shingles five inches to the weather and the upper run of rafter covered with shingles laid four inches to the weather.

If the barn has been braced as is shown in the drawings and if good workmanship is used throughout along with a good quality of material, it will withstand all pressure of wind and snow and the hay in the mow, and be a valuable improvement to the farm.

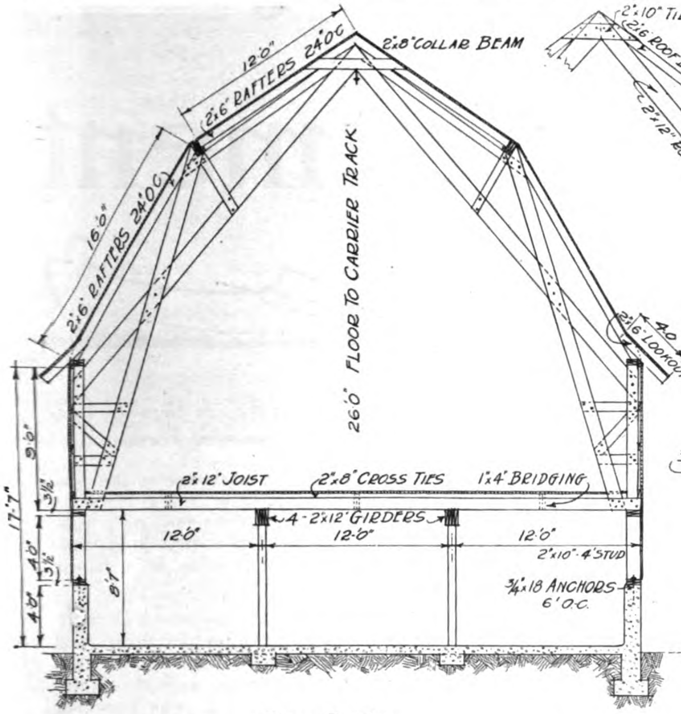
There are no heavy timbers in this barn frame. In the building of the trusses there will be required several long ten and twelve-inch planks which may not be found in every small lumber dealer's stock. In such cases, they may be spliced up out of convenient lengths if special care is used in securing a tight joint.

The kinds of covering which are most commonly used have been listed in the following list of materials, although any kind of sliding or prepared roofing materials may be used if so desired.

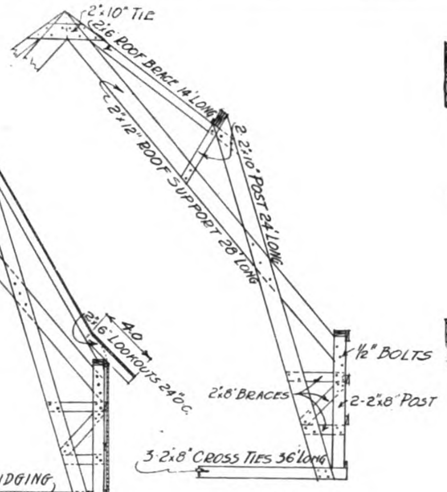
As a basis for estimate, a fourteen-foot section of this thirty-six foot barn has been taken. To compute the amount of materials required and to obtain only a general idea as to the costs of your barn, multiply the amounts listed below by the number of times that fourteen is contained in the length of barn that you will build. As for example a seventy-foot long barn that is 36-ft. wide:



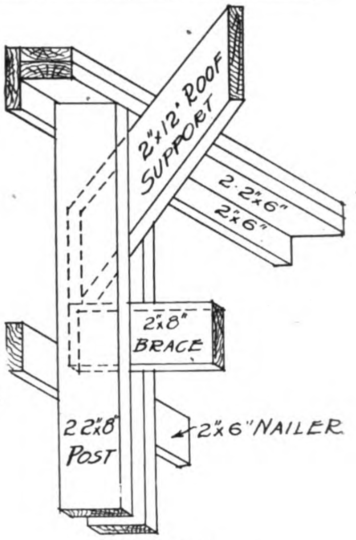
End Framing and Side Framing for a 36-ft. Barn



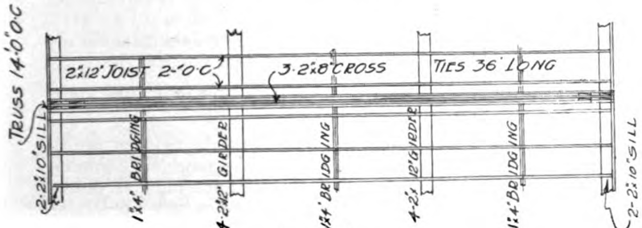
Cross Section



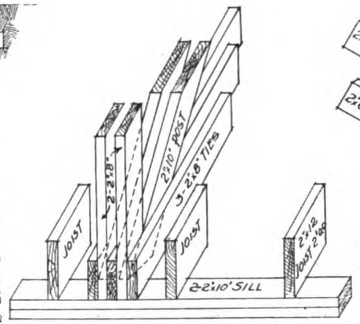
Truss Detail



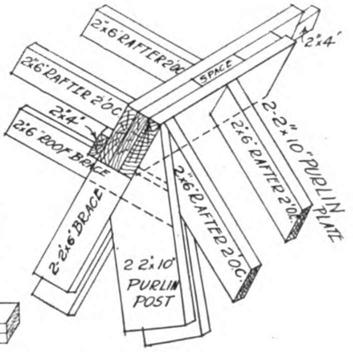
Detail of Plate



Joist Plan



Bottom of Truss



Detail of Purlin Plate

Five times the materials for a fourteen foot section and then add to this amount that which will be required for the building of the two ends as listed. Then add to this the material for the trusses and it will take four of them for a barn that is 70-ft. in length. Labor costs, barn equipment, windows, doors, hardware and paint of an up-to-date barn for the dairy farmer will amount to about fifty per cent of the above material cost.

MATERIAL REQUIRED FOR A FOURTEEN-FOOT SECTION (36 FT. BARN)

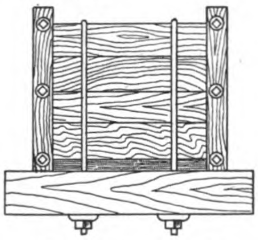
224 cu. ft. concrete walls	@25c	$56.00	
504 sq. ft. concrete floor	@10c	50.40	
		$106.40	$106.40

95 ft.	2 x 10		sills.
95 ft.	2 x 10		plates.
150 ft.	2 x 10	4 ft.	for studs.
56 ft.	2 x 12	14 ft.	nailers.
56 ft.	2 x 6	14 ft.	nailers.
112 ft.	2 x 8	14 ft.	plates.
256 ft.	2 x 6	16 ft.	rafters.
192 ft.	2 x 6	12 ft.	rafters.
53 ft.	2 x 8	10 ft.	center posts.
64 ft.	2 x 6	4 ft.	lookouts.
85 ft.	2 x 8	6 ft.	collar beams.
92 ft.	2 x 10	14 ft.	purlin plates.
19 ft.	2 x 4	14 ft.	purlin plates.
144 ft.	2 x 6	12 ft.	braces.
400 ft.	2 x 12	12 ft.	joists.
224 ft.	2 x 12	12 ft.	girders.

2093 ft. dimension lumber...	@$26.00	$54.41
470 ft. barn siding lumber...	@ 45.00	21.15
650 ft. roof sheating........	@ 23.00	14.95
7 thousand cedar shingles	@ 3.75	26.25
600 ft. ship lap flooring......	@$30.00	$18.00
Total for the fourteen-foot section..		$241.16

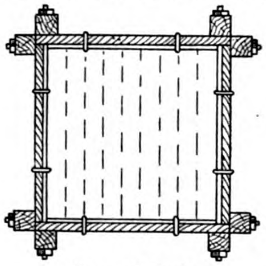
Building a Leak-Proof Water Tank

A BUILDER has had a great deal of trouble lately with poorly-constructed tanks, and after much experiment built one that has proved entirely satisfactory.



Elevation of Tank

To explain its construction: First, a good, strong bottom must be made of suitable material, and laid on a frame of heavy timbers. Then build the tank, using nails as usual, and after the box is completed apply the leak-proof trimmings, as shown in sketch. These consist of the corner braces, with ¾-in. rods running from each side and drawn up tightly; thus a strong non-leak tank is the result. Also note the rods running from the top of tank to the bottom, which are drawn up tightly, bringing all the cracks up close. If, as a double precaution, the tank is lined with thin flooring or similar material, you have a tank that will last for years without any care.—*Wood-Worker.*



Plan of Tank

Legal Department

What Is a Public or a Private Proposal?

An invitation to contractors to make offers or proposals to make bids to do required work, whether the invitations are private (that is given to a selected few) or public because they are advertised, does not differ very much in principle from the ordinary buying and selling of every-day life.

The ordinary buyer wants to buy at the lowest possible price he can get for a certain quality of work or materials. If he makes an offer for the goods the other party may accept his offer and close the bargain, and he may possibly have paid more than if he had let the other party mention his asking price.

As the usual thing, therefore, it is the seller who is required to make an offer by stating that he will sell his property or services at a certain price.

Construction contracts ar[illegible] similar. The person who wants [illegible] the work done invites those peop[illegible] who may want to do the work [illegible] state what their charges will be [illegible]y making bids, and accepts or reject[illegible]s them according to the price [illegible]med and the qualifications of the persons who send in their bids.

The fact that there is competitive bidding on the job induces close estimates on the part of the bidders who desire to do the work.

From the foregoing it can readily be seen that an advertisement for proposals is nothing but an invitation, a proposal, a tender or a bid is nothing but an offer, and the awarding of the contract or the acceptance of the offer is really nothing but a contract to buy and sell.

Sometimes the fact that a bid or a proposal is only an offer to sell is not understood. This is particularly true in many cases when the bid is accompanied by involved restrictions and conditions and the parties or one of them gets the impression that a contract has been made when in fact only an invitation to bid and a bid which has not yet been accepted have been made.

Before an offer has been accepted it, of course, can be revoked or recalled. When it has been accepted, however, it cannot be revoked or recalled without the other party's consent, for the combination of offer and acceptance makes a binding contract whose obligation cannot be evaded.

The certified check usually required, to be submitted with bids upon the understanding that the check is to be forfeited if the offer is withdrawn, is an effort to protect against the revocation or recall of offers after they have once been made.

George Kaiser, LL.D., our legal adviser, will answer any questions whose solution will aid in clearing up legal difficulties that subscribers may be in. He will answer direct by mail and give his opinion as to the correct procedure. Such of the questions and answers as are of general interest to the trade will be published in these columns.

All inquiries must be accompanied by the name and address of the correspondent, so that he may be answered direct or that he may be requested for further information if necessary to the intelligent answering of his question. No names will be published, only initials or a nom de plume. Remember that this service is free to subscribers.

Address Legal Department, Building Age, 243 West 39th Street, New York City.

The invitation to bid or the advertisement of construction work should contain only the necessary general information which will enable a contractor to determine if he cares to make an offer. Full and explicit instructions take up space—and space is expensive. If the invitation to bid shows the character of the work, the kind of materials required, the location of the job, its magnitude and when it is to be started and finished, and the time when the last bid will be accepted, and the names of the persons wanting the work done—that is enough. The contractor can tell from the foregoing if the job is in his line, if he can finish it in the stipulated time, and whether he can furnish the necessary bond, and the parties inviting proposals are not subjected to needless expense.

Can an Architect Reject Lumber Furnished for Concrete Forms?

That an architect in charge of the construction of a building has a right to reject unfit material furnished by a subcontractor for the construction of concrete forms is the decision in a recent Washington case.

It was contended in this case that there was no lien for the value of lumber used in making concrete forms because the lumber did not become a part of the finished structure, and it was provided in the contract that the concrete forms were to be constructed and removed, and thus the concrete forms should be classified just as tools and appliances to facilitate work are classified.

The court refused to adopt this view, however, saying:

"The use of concrete in modern building operations has become so common that we may almost take judicial notice of the fact that buildings are no longer erected without the use of it, and that form lumber when once used is stained, warped, wired and coated with cement so that it is no longer a commercial commodity and is to be classed as waste. We see no more reason for rejecting form lumber as a subject of lien than we would have for refusing a lien for false work erected to sustain an arch or floor."

A Question Concerning Sureties on Bonds

From D. L. C., Arizona.—Where a contract recites that contractor shall "provide all the material and perform all the work" and a bond is given which recites as its condition the entering into of the contract to furnish all the labor and material makes the bond a part of the contract.

Query: After the contractor has defaulted without paying the material men in full and the owner completes the structure, paying out the balance due the contractor under his contract, have the material men an action against the sureties on the bond for their unpaid balance?

This case has come to trial and is to be decided on written briefs. Will you kindly cite us to legal opinions which

will sustain our argument that we have such a direct action?

The contract mentioned was for a public building where no lien rights apply.

Answer.—Of course it is impossible to give a very pointed answer to an inquiry of this kind when I have had no opportunity to examine the contract or the bond. In addition, the letter is not any too clear.

A provision in a contract for public work that the city may retain money due the contractor until he shall have made all payments, gives no right against the city if it pays the contractor in full, but an action may be started against the sureties on the contractor's bond if the bond provides that the contractor shall pay all claims for labor and materials, where express statute so provides.

There are numerous cases cited on this point in 30 Am. and Eng. Enc. (2d Ed.), page 1288.

In Repairing, Who Does Old Material Belong To?

From R. M. S., Illinois.—If possible please give us your opinion in the following matter.

A contracts with B for the erection of a septic tank and also to connect cellar drain to sewer pipe leading from the septic tank to an intercepting sewer.

The point from which the sewer pipe is run from the septic tank to the connecting sewer not being designated, it is therefore optional with the contractor to choose his own route. A chooses to follow the line of an old basement drain so that he can dig out the old tile and reuse them for other purposes. After they have been dug out, B contends that these drain tile belong to him and that A had no right to use them without B's permission.

The above work was done on the basis of a stipulated amount. We have tried to make this little difficulty plain, and write for your opinion in hope that similar matters having arisen like this, possibly legal decisions have been given.

Answer.—There is undoubtedly a general belief among contractors and builders that when they do work under a contract to raze, demolish or remove old buildings, etc., or remove old materials that these materials belong to them.

Whether or not they are entitled to these materials is either usually a question of intention on the part of the parties to the contract or must be found out from a study of the custom and usages in their locality.

If there is a custom or usage in the building trade in the vicinity that material taken out in similar cases belongs to the contractor, that custom or usage will be recognized if it was known or should have been known to the parties to the contract.

It is a good thing to put a clause in contracts of this kind covering materials, as the contractor can then estimate how much material the job itself will supply, and he can reduce the price of new work by using it. In the case you mention it would not be unreasonable for the contractor to use the old material, but his right to do so depends on the contract you made and the custom in your locality.

When Work Is Defective, Must Contractor Be Paid?

From H. F. L., New York.—I noticed your insertion in BUILDING AGE and respectfully submit the following excerpts of a contract for the erection of a bungalow as regards the finished labor. Under heading of "Miscellaneous," extract of paragraph 54 reads as follows: "The owner reserves the right to make any change whatever, and the cost to be agreed upon between the contractor and the owner before said changes to be made, and any such additions shall not make void this contract."

Extra work, for which contractor now claims compensation, does not appear to have been made. However, should further investigation prove the contractor's assertion to be true, can the owner be compelled to make payment for such work on the face of the stipulation outlined in paragraph 54?

Under heading of "Additions," extract of paragraph 57 specifies: "The cellar is to have a concrete bottom. Cellar bottom to be three inches (3″) thick when finished, and to be graded to an outlet in near the water meter of pump." Examination of cellar bottom discloses the fact that the depth ranges from one and one-eighth (1⅛) to one and one-half (1½) inches. Instead of being graded toward the outlet mentioned in the contract, it is graded in the opposite direction.

Under heading of "Exterior," extract of paragraph 23 reads: "Cover the entire building with white stucco, guaranteed not to crack; and lath is to be nailed to seven-eighths-inch by two-inch (⅞″ by 2″) grounds." Investigation shows that contractor used one-half-inch (½″) lath instead of seven-eighths-inch by two (⅞″ by 2″) grounds as agreed upon. Also in various parts of the exterior of the building, as well as the sidewalk, there is considerable deterioration.

I have advised the contractor that I would pay him the balance due on contract subsequent to his making the necessary alterations. Contractor now refuses to make any further stipulations, claiming that finished labor conforms, in every respect, to the original agreement. What I particularly desire to know is, whether according to law, owner can be compelled to reimburse the contractor for balance, with the above-mentioned discrepancies in view. Also, I would like to know whether a contractor has the prerogative of foreclosing a mechanic's lien.

Answer.—The owner in the case you mention may be compelled to pay the contractor but he can very likely put in a counter-claim for damages. As a usual thing a contractor has a mechanic's lien.

In a case of this kind the only sensible thing to do is for the owner to retain local counsel to look after his interests. Before he is advised the whole matter should be carefully looked into and the entire contract should be carefully examined. If this is not done, the owner may be wrongfully advised and will have cause for regret later.

Does Lien Take Precedence Over Mortgage?

From K. E., Illinois.—Does a lien take precedence over a mortgage on a residence, new or old? Say a person has a first mortgage on a residence, a plumber afterward installing a bathroom, and the party living in the house does not pay the bill. The plumber consequently takes a lien on the building. In case the building is sold, or foreclosed by the mortgagee, and the amount of the sale would not net enough to pay the plumber and the amount of the mortgage, would the lien have to be paid first? In other words, would the person holding the mortgage suffer a loss?

Answer.—As a general proposition, where property is subject to a mortgage at the time a mechanic's lien accrues the mortgage retains priority over the lien and the lien comes after it, even though the value of the mortgage security is increased by the labor or material furnished by the claimant of the lien.

Of course, if the lien were filed before the mortgage was recorded, the lien would come first. In the case you mentioned, the person holding the mortgage would not suffer any loss.

This Builder Waived a Lien. Can He Collect?

From F. X. G., Massachusetts.—About four years ago I was employed to build a three tenement house by the day. During construction I received two payments. When it came to the final payment it was necessary to sign off a lien in order that he might be able to borrow it from the bank, which I did. I knew the man a number of years and being a friend of his, I had all the confidence in the world in him. Is there any hope of getting this balance of $500?

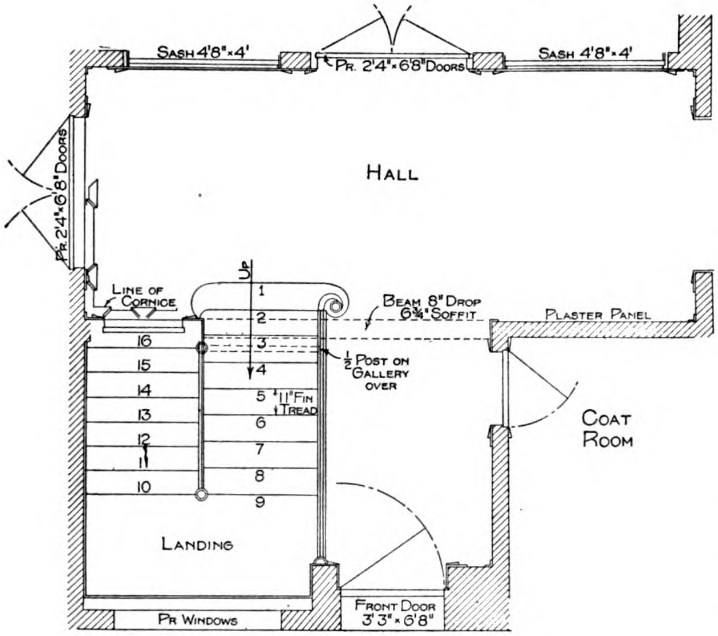
Answer.—Of course, if you waived your right to a lien you cannot make any claim to a lien now, as a lien once waived, is waived forever. Place your claim in the hands of some local attorney and if the man has anything you ought to be able to collect on your judgment.

A Beautiful Colonial Stairway

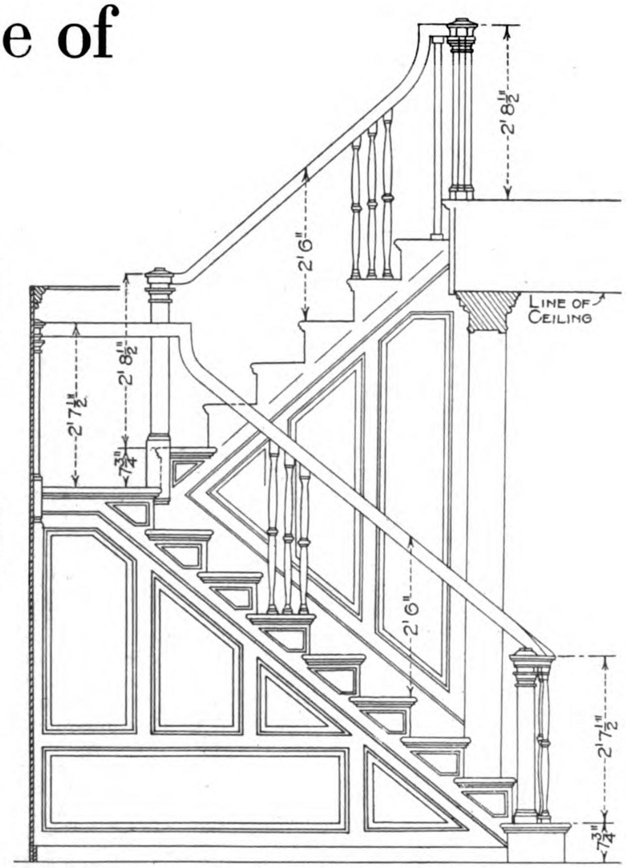
William F. Palmer

Ralph S. Vinal, Architect

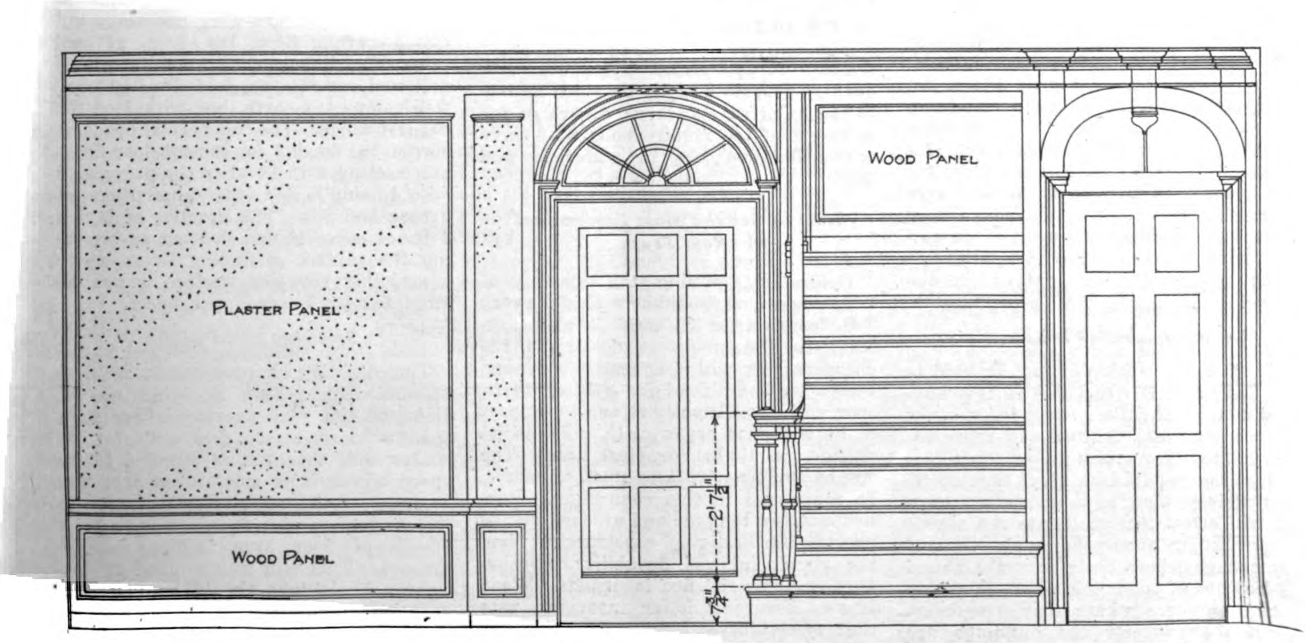
Built in the Residence of at Winchester, Mass.



Plan of Hall and Main Stairs. Scale 3/16″ = 1 ft.



Side Elevation of Staircase. Scale 3/16″ = 1 ft.



Elevation of Staircase Side of Hall. Scale 3/16″ = 1 ft.

Important Features in Designing the Modern Commercial Garage

Details of Construction, Heating, and Plumbing Are Pointed Out in a Manner that Will Aid in Securing Economy

By Richard Shepard

THE building of public garages or large commercial garages for private use has not been much affected by the existing war conditions, which have affected many classes of building construction, owing to the fact that motor cars and trucks are being brought into more general use as a wartime necessity to relieve traffic congestion, and suitable and convenient storage facilities must be provided.

The present high cost of materials and labor makes it more necessary now than ever before that the contractor who designs and constructs buildings of this character should have a thorough understanding of the requirements of the modern garage and of the most approved and most economical construction to secure the desired results. This article, presenting all phases of the work, is the result of six years' experience in the building of commercial garages.

The builder is frequently consulted by the man who intends to build, previous to the final selection of the site, and he should be in a position to give advice regarding all details. The location should be determined by the necessity; this being determined by the number of cars in the vicinity requiring storage, the proximity of other garages and the volume of traffic over the thoroughfare on which the building is located or on nearby thoroughfares. A corner site is not more desirable than an inside lot for a one-story structure, and two or more stories are not recommended except for congested districts where the cost of the site is out of proportion to the floor area of a one-story building, or where land is sufficiently cheap to permit of an outside runway to the second floor. The value of sidewalks for light will be discussed later.

Good Appearance Is Essential

Too much attention cannot be paid to the design of the façade. A few hundred additional dollars expended to make it an outstanding feature will represent only a small proportion of the whole cost and will be repaid in a short time by its advertising value, as most garage owners will attest that motorists are almost as particular about the appearance of the garage where their cars are stored as they are of the hotels where they stop or the theaters where they are entertained. Frequently the buildings are located in high class residential sections. A well designed façade has advertising value for the builder as well as for the owner.

The dimensions of the lot usually govern the size of the building; but where it is not necessary to cover the entire lot, it has been determined by experience that 50 ft. is the most economical width, 55 ft. provided more than the necessary space, while a width of 60 ft. is wasteful. The length of the building is determined by the depth of the lot, or if the entire lot is not to be covered, by the spacing of trusses or by the spacing of cars, allowing 7 ft. for each car. When possible, the building should be nearly square, for the nearer a building comes to being square, the more floor area is obtained within a given perimeter of walls.

For buildings under 40 ft. wide steel girders and flat roof construction may be found to be most economical; but when the width exceeds this dimension, no other type of construction can equal the trussed roof and no truss is more in favor than the triangular wood truss. To successfully compete for contracts for this class of work the builder should have a thorough understanding of the design and construction of this type of truss. Inexperienced designers frequently provide designs that are not up to the required standards, or are so far in excess of the requirements that there is considerable loss in materials and labor.

How to Get the Most Economical Roof Truss

Before determining the spacing of trusses, designs should be made for every 2-ft. length from 12 to 18 ft. and careful estimates made to determine the cheapest. It will frequently be found that a truss designed for a 12 or 14 ft. span will be sufficiently strong to support a 16 or 18 ft. span with only slight changes in timber or steel area. The size of purlins or rafters must, of course, be considered in this connection. Purlins and 2-in tongued and grooved planks provide the best roof construction from the standpoints of durability, appearance and lowered fire insurance. Wood trusses secure a lower insurance rate that steel trusses.

The existing grade of lot should determine the finished floor grade. This may be as much as 3 ft. above the sidewalk grade at building line without being seriously objectionable, as the garage floor can be reached by an incline driveway. Excess grading should not be considered as part of the cost of the building, but rather as part of the cost of the site. Where possible, the floor line around outside walls should be kept level and be graded from there to cesspools at the center of the building. It is not entirely necessary that the floor line should be kept level, for a grade of 1 in. in 10 ft., or even more if necessary, will not be a detriment when lowest costs are desired or where building is situated between two streets with different levels.

The most approved clear height from floor to trusses is 12 ft. This is necessary to provide ample clearance for large trucks and vans. The doors, of course, must be of the same height. This height can be reduced to 10 ft. where pleasure cars only are to be stored, and will result in a saving of wall height and contents to be heated, but it is not recommended because the saving is small and the value of the building depreciates, because only one class of cars can be accommodated.

It was formerly considered that 12 or 14 in. of cinders were necessary under a garage floor, but 3 in. of well proportioned slag or concrete and a 1-in. grit and cement top, laid directly upon well compacted earth, has withstood the hardest usage. The commercial products now on the market for cement floor finish are meeting with favor in the prevention of "dusting" and the absorption of grease and oils. The practice of laying 4 in. of concrete and floating or brooming the surface is finding favor where a smoothly troweled surface is not desired for its better appearance.

Securing Good Light

The lighting arrangement requires especial care. Flat skylights on the slope of the roof provide better light than windows in the side walls for the reason that the light is directed to the space where it is most necessary, that in front of the cars. Skylight area in the proportion of 1 ft. of glass to 15 or 16 ft. of floor area is the required amount. This will give a flood of daylight. A skylight should be placed in each half-bay, and its dimensions should be in proportion to the dimensions of the half-bay. For exceedingly wide spans the skylight should be staggered to pro-

vide better distribution of light. Quarter-inch wire glass should be used, not only to secure lower fire insurance rates, but for insurance against the injury to persons or cars by the accidental breaking of glass.

Windows in the side walls are desirable only in the repair department, to give direct light on the work-bench for fine work. This department should also have a repair pit about 4 ft. by 7 ft. and 3 ft. deep, with a removable cover of 3-in. planks. Ventilators with dampers should be provided at the ridge to carry off fumes and smoke.

The most approved covering for a trussed roof is a built-up roofing, either of four-ply felt and pitch covered with slag or of asbestos. Roll roofing applied to a steep roof tends to open at the seams, due to the wind pressure, unless the utmost precaution is used in cementing the seams. Where felt and pitch roofing is applied, one ply of rosin sized paper should be laid under the roofing to prevent pitch from running through sheathing in hot seasons and damaging car tops. The usual pitch for triangular trusses is 1 in 3.

All wiring for electric lights should be in conduit. For the ordinary garage of 50-ft. width, two rows of lights should be provided, located 18 ft. from each wall, placing two lights on each truss, four lights on each circuit and a separate switch for each circuit. For economy in the consumption of current, the lights on the first and third trusses, the second and fourth trusses and so on, should be brought together to form the circuits so that every alternate truss can be lighted when the full capacity is not required. Outlets for the exterior should be provided and wall plugs for portable lamps, placed 5 ft. from the floor, should be provided on every alternate pilaster throughout the length of the building. Switches should be placed in a cabinet at the most convenient location, preferably near the main doorway or office.

The side walls should be given two coats of cold water paint or whitewash, having a black base 5 ft. high, both for the sanitary effect and to prevent the absorption of light by dark walls. The whitewashing of surfaced timbers in the roof construction is not recommended, due to the tendency of the whitewash to peel off.

Details of Heating System

The most satisfactory heating system is a two-pipe steam system with overhead supply and return at the floor level. Wall radiation should be placed on side walls at a height of from 6 to 8 ft. above floor level. The lowest insurance rates can be secured by placing a plant under ground, covered with a reinforced-concrete floor and without access except through an iron sidewalk door, reached from the exterior of the building. A temperature of 50 deg. will fill all requirements for the average garage. Special consideration must be given to the sectional area and height of the flue, as it is usually necessary for it to be extended higher than the ridge of the roof to secure results.

The plumbing should include toilet facilities for men and separate conveniences as an inducement to ladies who drive cars. Rain conductors, even when not required by regulations, should be of iron pipe placed on the inside of the building. At least one auto washer with revolving arm should be installed, supported on the bottom chord of a truss. A slop sink of ample proportions to accommodate a large bucket should be provided at a convenient location. When hot water is desired, a tank heater should be installed in the heating room.

Mechanical equipment, such as oil and gasoline tanks and pumps and air compressors, should be provided by the owner, as he will no doubt have occasion to call upon the manufacturers for repairs or adjustments and will secure better service owing to the fact that he was the original purchaser.

Efficiency in Construction and Arrangement of Basement—Part II

Interesting Little Kinks That Help Utilize Waste Space

By Arthur Weindorf, Architect

THE laundry if placed in the basement should be placed in one corner of the building under the kitchen, where the plumbing fixtures can be easily connected to the plumbing pipes. There should be sufficient windows to allow for the escapes of steam and to give the room plenty of light. This room should also be inclosed with a dust proof partition to keep out all dust.

The laundry fixtures should consist of set tubs of soapstone, vitreous or enamelled ware and should be placed in the center of the floor and allow for a clear working space all around. This arrangement will allow for a washing machine to be backed up to any side of the tubs. A drain in the floor should be arranged near the tubs so as to catch all waste water.

The ironing board should be placed near the windows and have sufficient working space all around. The laundry stove should be placed near the tubs and also within easy reach of the ironing board. It is found uncomfortable to stand at the tubs or ironing board on a cement floor and to correct this a wooden slat platform, shown in Fig. 16, will be found a great benefit. This slat platform can be built up of timber of 2 inches by 3 inches about three or four feet long, and set about 20 inches apart, strips of timber 1½-in. by 2½-in. or 3 in. being nailed on top.

Many of the laundries in the larger dwellings are equipped with a power washing machine which does away with the constant standing and washing drudgery. A power ironing machine takes care of all the flat pieces, greatly reducing the ironing work and making this part of the house very efficient.

Fig. 11 shows how soiled clothes can be sent from the floors above to the laundry. This arrangement will save a great deal of time and labor of carrying the soiled clothes to the laundry. The chute can be carried up to all floors and should be carried up straight avoiding all turns. Inside measurement should be 8 x 12 in., the chute being metal lined with galvanized iron so that the clothes will readily slide down into receiving closet. On each floor the chute should have a hinged receiving door and should be arranged with a latch so as to keep it locked when not in use.

The receiving closets can be about 2 feet by 3 feet for ordinary use or larger, depending on the amount of laundry that it would be required to hold. The inside of the closet can be finished off with metal same as chute or the boards can be planed smooth so that the clothes will not catch thereto.

Fig. 13 shows the folding clothes rack. This rack will be found very convenient, as it is always to be found in one place. When not in use it can be folded back against the wall out of the way. It can be constructed by securing two pieces of timber 1 inch by 2½ inches by 5 feet in length, which form the side pieces and are to be placed together and drilled to hold ⅝-inch round sticks, which should be about 4 feet long and glued and nailed into the side pieces. The lower ends of the sides can be secured to the wall by attaching two screw eyes for each side in the wall and carrying a bolt through the eyes and side pieces. The top part of sides are to be held in place by a strong cord or chain and they are attached to each side and thence to two blocks that

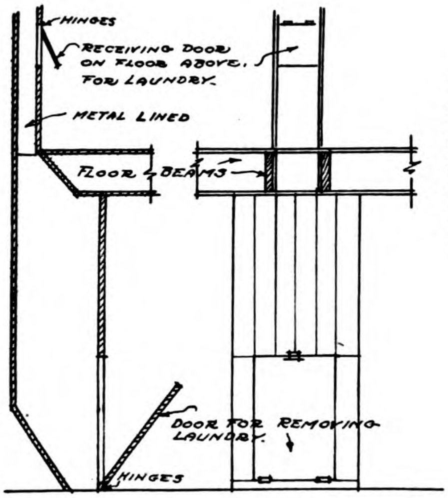


Fig. 11—A Clothes Chute Saves Energy in Handling Soiled Laundry. Section and Elevation

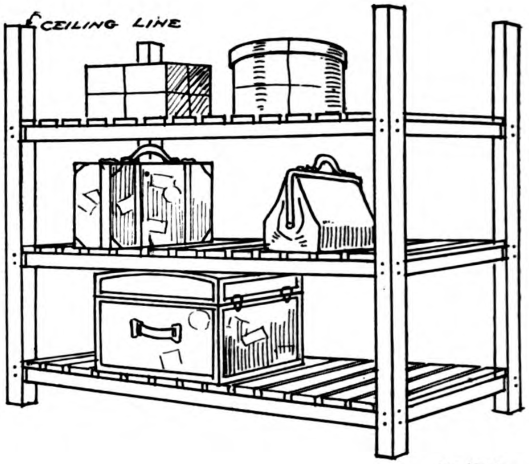


Fig. 12—Keeping Trunks, Suitcases, etc., in Good Condition and Off the Floor

have been secured to the wall. The side of blocks are to have hooks that will hook over top stick that is left go through side pieces of rack and which will hold rack back out of the way.

Fig. 14, showing a folding table, will be found very convenient and handy. It can be built either under a window or up against the wall where desired. The table top can be built up of tongued and grooved boards glued and nailed together and should be about 2 feet 6 inches by 4 feet in length, or larger as required. Two wood brackets are also constructed, as shown in sketch, of 1½-inch timber and hinged against wall so that they can be opened out to hold table top that is also hinged to wall that opens up. When the table is not in use all that is necessary is for the brackets to be shoved back to wall and the table drops down out of the way, taking up a space of about 2½ inches against the wall.

The storage room for food supplies in the basement is the next to be given attention. A vegetable and fruit room should be provided. The vegetable room should be provided with open slat bins, as shown in Fig. 20, so that potatoes, etc., can be spread out loosely to prevent decay. A window should be provided so bins can be ventilated. The window should be provided with a shutter so that room can be kept dark if it is so desired. The size of this bin depends upon the quantity of vegetables that are to be stored, but a bin 3 by 6 feet should be of sufficient size for the average family. The corner posts can be 2 by 4 inches, securely nailed to the ceiling and floor. The bins are to be about 18 inches apart and built up of side pieces of 1¼ inches by 3 inches and securely nailed to posts. The slats can be 1 x 2½ inches and securely nailed to the sides. To increase the strength of the slats an extra piece of 1½ by 2½-inch timber can be carried from end to end and each slat nailed thereto.

The preserve closet for preserves and canned goods is shown in Fig. 21. This closet has open shelves instead of bins. The preserve closet should be provided with shutters or top so as to exclude light, but arranged with screens below so as to give good ventilation. This closet can be built about 2 feet deep and 4 or 5 feet in length and from the floor to ceiling. The exterior can be built up of tongued and grooved sheathing boards well driven together. The front can be arranged with shutter doors with screen doors below. Old shutters can be utilized for this part of the closet. The shelves are to be 18 inches in width and are to be about 12 inches apart and movable, resting on cleats that are nailed to side of closet so that shelves can be adjusted every 6 inches.

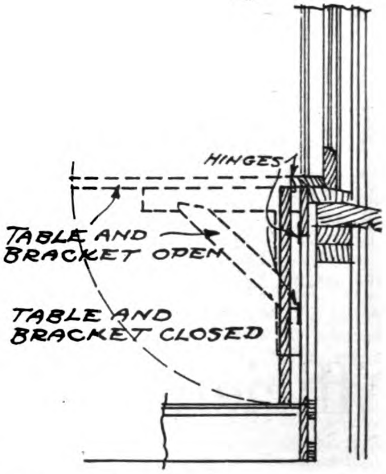


Fig. 14—A Folding Table Can Be Built Up Under the Window

The cellar stairs are almost always sacrificed in one way or another. They are likely to be too narrow, steep, crooked or provided with very little headroom. These stairs are used more than any other stairs in the house, and an examination of any old house will confirm this,

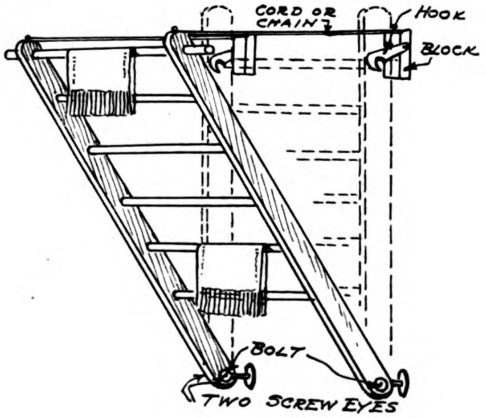


Fig. 13—A Folding Clothes Rack

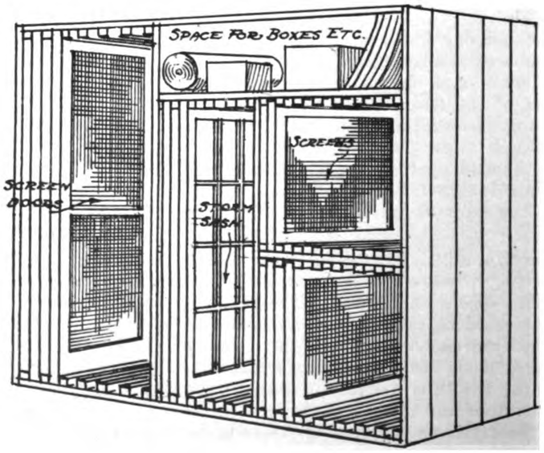


Fig. 15—Convenience in Keeping Storm Sash Shutters, Etc.

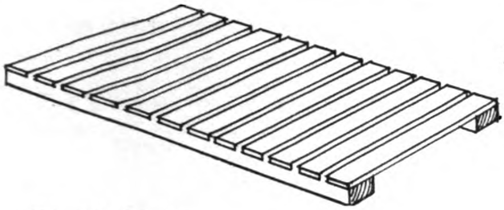


Fig. 16—A Slotted Platform Saves Fatigue When Standing on a Cement Floor in the Laundry

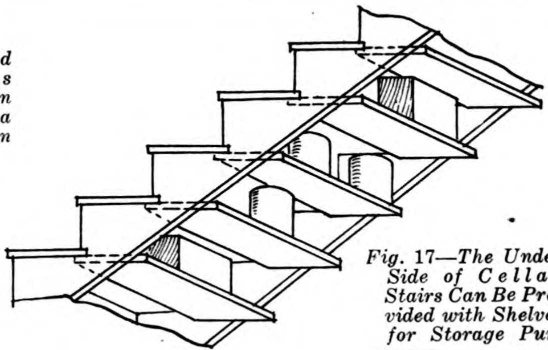
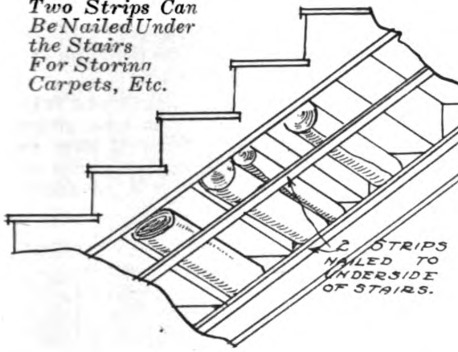


Fig. 17—The Under Side of Cellar Stairs Can Be Provided with Shelves for Storage Purposes

Fig. 18 below—Two Strips Can Be Nailed Under the Stairs For Storing Carpets, Etc.



for the wear on the treads tells the story. The cellar stairs should be strongly constructed, with an easy riser and tread and plenty of headroom. The stairs should be at least 2 feet 8 inches in width and have a strong handrail.

The under side of stairway can be utilized for shelves, as shown in Fig. 17. Boards 1 inch by 10 inches in width can be securely nailed to the under side of treads and to the stairway stringers. If desired a wider shelf can be so constructed and every other shelf left off so as to give more room. Many small cans, boxes, rolls of paper, etc., can be stored out of the way in this manner, and no extra space will be taken from the cellar.

Pieces of carpet, wall paper, etc., can be stored under the stairs and out of the way, as shown in Fig. 18. This can be accomplished by just nailing two 1 x 2 inch strips on the under side of the stairway.

Many owners at the end of the summer or winter season just take their screens, shutters or storm sash and just pile them carelessly on top of one another, thereby marring or scratching them. The weight of the above screens or sash cause the under ones to sag or twist out of shape, causing much trouble to fit same properly to windows or doors next season. The storm sash, screens, shutters and doors can be properly kept so that any one can be removed without disturbing the rest and kept so separated that none will get marred or scratched, as shown in Fig. 15. Each screen or storm sash can be lettered to correspond with its respective window, and the slide in the closet can be so lettered to hold this particular screen or storm sash, enabling you to pick out in an instant any one that you may desire. This sort of a closet can be very easily constructed. The size of screens, storm sash, doors, etc., must be first ascertained. The exterior can be built up of tongued and grooved sheathing boards; 1 x 1½ inch cleats are to be nailed at the top and bottom, allowing sufficient space, or about ¼ of an inch, so screens and doors, etc., will slide easily. The front part can be covered by a curtain or, if a little more time is taken, sliding doors can be arranged in front to help keep out the dust, thereby keeping the screens, storm sash, doors, etc., in good condition. Where screens do not take up the full height of the closet the top part can be used for storage purposes, as shown in sketch.

Trunks, suitcases, boxes, etc., can be arranged and kept off the floor, as shown in Fig. 12. This rack will be found very convenient, as you will always be able to find that bag or trunk in its place. By building up the rack as shown it will keep the trunks, suitcases, etc., off the floor and prevent them from getting any unnecessary hard usage. This rack is very simple to construct, being built up of 2 x 4 inch posts that are nailed to the floor and ceiling, side pieces and end pieces of 1½ x 3 inches being nailed to the posts. Upon these strips a slat shelf is laid of 1¼ x 3 inch stuff, leaving an inch between slats. A curtain can be arranged around rack to keep off dust. Shelves will vary in height depending on the trunks and bags to be stored.

A movable shelf that can be attached to basement ceiling beams is shown in Fig. 19. This shelf can be made up of one or more shelves, and shelves should be well nailed to the side pieces to prevent them from sagging. The top piece that rests on the two nails or screws in ceiling beams should also be well nailed to the side piece. This shelf should be built so that it will fit on the outside of two or more sets of beams. All that is necessary is to drive in two nails on each side to hold the T piece and this will hold the shelf in a fixed position. Shelf can be removed at any time and placed elsewhere with very little trouble.

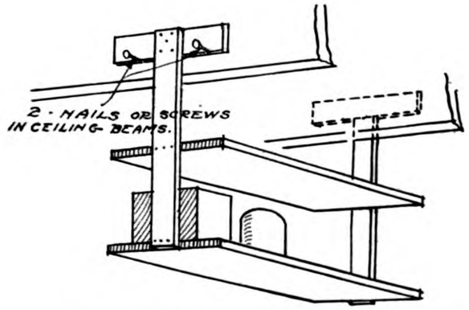


Fig. 19—A Movable Shelf Can Be Attached to the Floor Joists

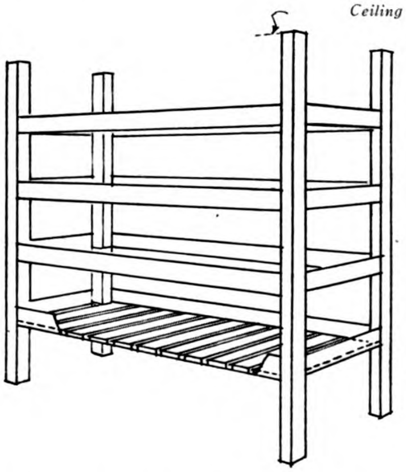


Fig. 20—The Vegetable Room Can Be Provided with Open Slat Bins

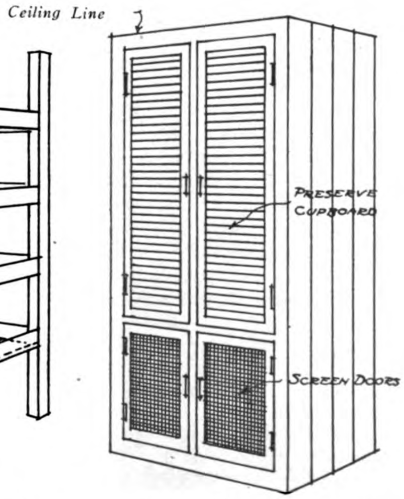


Fig. 21—A Preserve Closet

Unusual Use of Wall Board In Construction of $1700 Cottage

PROBABLY no more interesting example of the practical utility of house construction can be found wall board in connection with than the attractive cottage which forms the basis of the present article. Not only does it possess novelty and economy, but combines with an attractive exterior a very neat artistic interior finish.

One of the most interesting features in connection with the work, is the construction of the partitions and outside walls. Beaver board was specified and used throughout in living room, dining room, pantry, kitchen, bath room, three bed rooms, sleeping porch and the passageway from which open the principal rooms on the floor. The studs are 2 x 4 in. and the wall board was nailed to the outside of them and not to the inside. The studs were dressed and afterward stained a grass-green. No sheathing paper was used over the studs, but the wall board was nailed directly to them and over this was placed 10 in. yellow pine siding 1 in. thick put on clapboard fashion and nailed through the Beaver board to the studding.

The floor joists under the main portion of the building are 2 x 8 in. while in the kitchen and maid's room the joists are 2 x 6 in., all placed 18 in. on center. The plate is made up of two pieces of 2 x 4 in. stuff. Partition and wall studs are of hemlock and the ceiling joists are ⅞ x 6 in., also placed 18 in. on centers.

The sash is 1⅜ in. pine painted two coats and the glazing is double thick American glass.

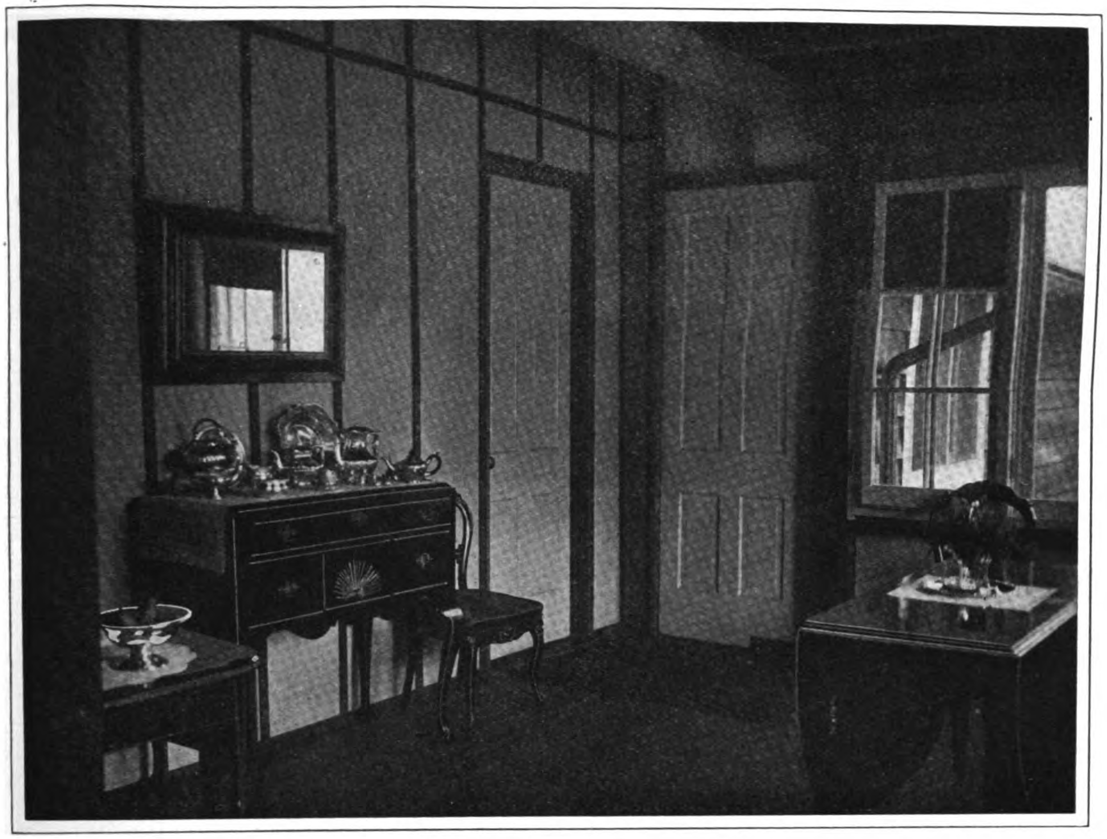
The outside doors are 1¾ in. pine painted while the inside and locker doors are of stock pattern.

The cottage here shown was built in thirty-six days by one man and a helper and about 5000 ft. of Beaver board was used. The wall board was all put on in one day being secured to all studs with flat-head nails that were invisible as soon as the siding was applied.

The Beaver board which was fastened to the outside of the studs and under the clapboards, was painted a rich cream color and showed within the room giving very neat effect. In order to carry out the decorative scheme of having exposed studding on all four sides of the living room and bed rooms, the partitions between the hall and the living room as well as between the dining room and living room were made by placing the wall board on one side only of the studding. This gave smooth walls and over the nailing and joints at the studs plain decorative strips were nailed.

The cost of the cottage here shown, which is located in Elma, a suburb of Buffalo, is stated by the architects to have been $1,700, this including painting and plumbing. The cost of the painting alone was $87, this including two coats on the Beaver board, staining

A Cottage in Which Wall Board Was Used in Novel Fashion

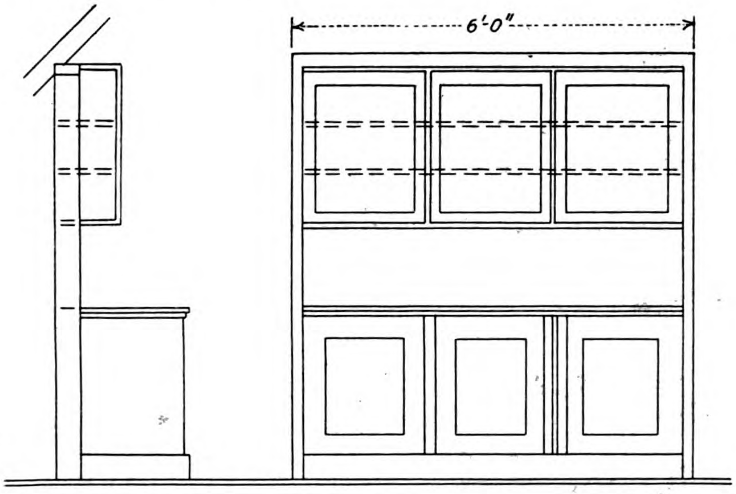


The Dining Room, Looking Toward the Pantry

The Living Room, with View of Porch Beyond

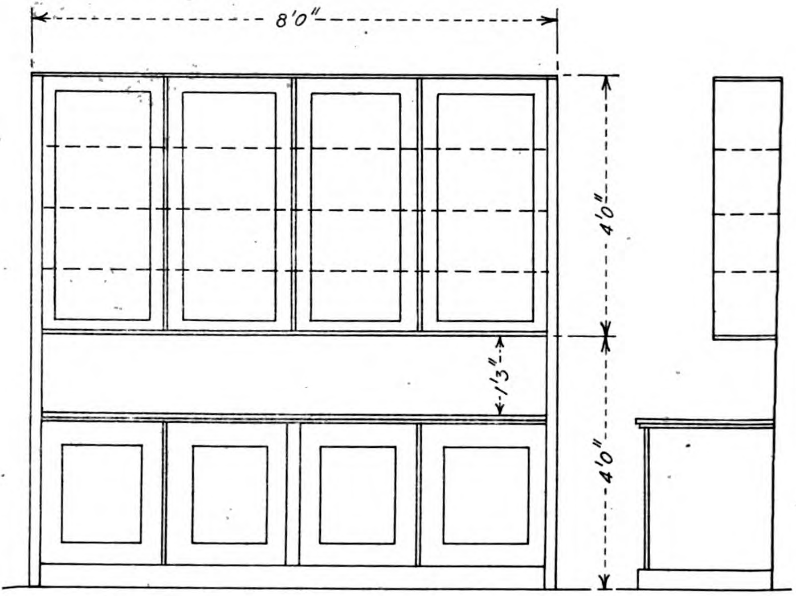
the exposed studs and creosoting the exterior. walls.

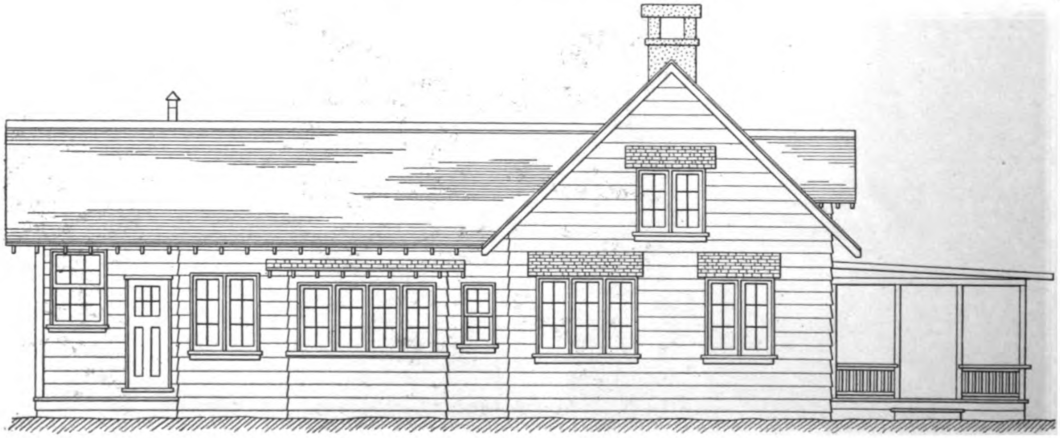
The architects were Green & Wicks, 110 Franklin Street, Buffalo, N. Y. We are advised that Beaver board used in the manner here described is satisfactory for all kinds of construction and while the idea has many possibilities for the summer cottage, the manufacturers recommend that the wall board be nailed to the inside of the studding in the regular way for general building work.



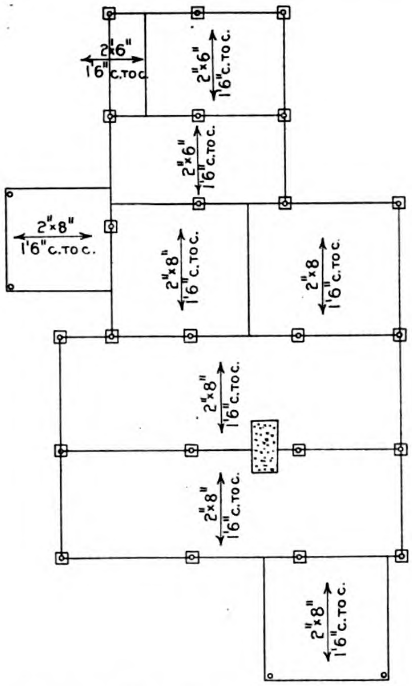
Elevation and Section of Kitchen Cupboard. Scale ⅜"-1 *ft.*

Elevation and Section of Shelving in Pantry. Dotted Lines Show Position of Shelves. Scale ⅜"-1 *ft.*





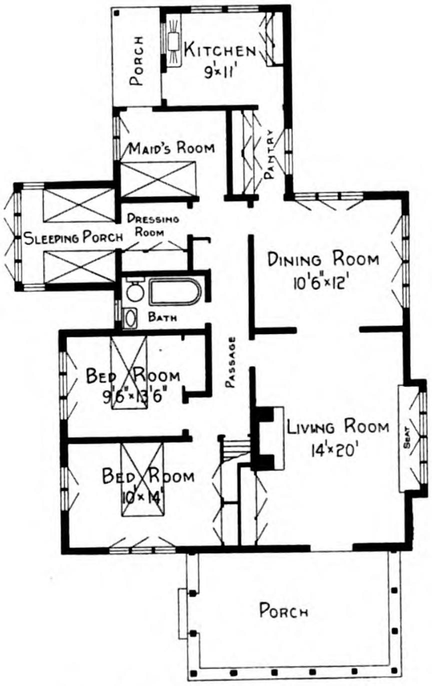
Left Side Elevation. Scale 3/32"-1 *ft.*



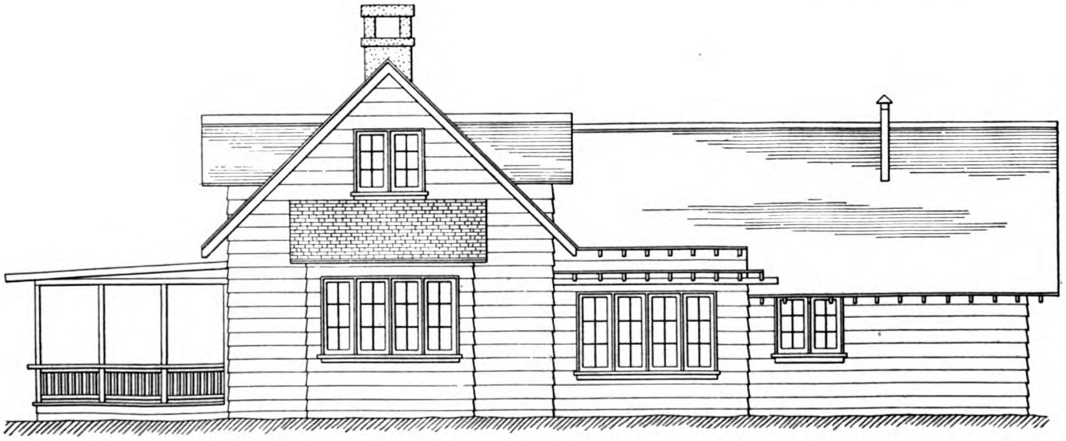
Foundation Plan, Showing Cedar Posts Set in Concrete, and Hemlock Girders

Front Elevation. Scale 3/32"-1 ft.

Rear Elevation. Scale 3/32"-1 ft.



Floor Plan. Scale 1/16"-1 ft.



Right Side Elevation. Scale 3/32"-1 ft.

Department of Masonry Construction

CONCRETE, BRICK, ETC.

Practical Ideas Which Will Help You Do A Quicker and Better Job

How to Build and Fireproof with Hollow Tile —Part II

Construction of Window and Door Openings is Explained, with Methods of Making Watertight Joints

Various Shapes and Sizes of Hollow Tile Blocks Suited to This Work Are Described

By J. J. Cosgrove

IN masonry construction, window and door openings are provided with a sill. Up to recent years this sill was invariably of stone, although more recently cement concrete has superseded stone to a large extent.

In hollow tile construction, stone and concrete sills are dispensed with, special hollow tile blocks having been provided for this purpose. Illustration of a sill block is shown in Fig. 6. These are made in varying widths for use in walls of various thickness and may be used in connection with brick walls when desired.

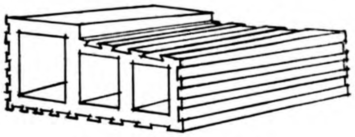


Fig. 6—A Sill Block

The manner in which sill blocks are used, and the way in which a window frame and casing are built to them, is shown in Fig. 7. The illustration shows the outside of the sill blocks and outer walls of the building stuccoed, although both walls and sills may be left rough, as is commonly done in factory and other industrial buildings. Where the window frame rests on the sill, it is good practice to bed it in roofers cement to prevent wind and rain from blowing through. It is well, also, to fill in under the outer part of the window frame where it rests on the sill with cement mortar.

If it is desired to use cut stone sills instead of the hollow tile sill blocks, they can be used, and the tile work is then built up as shown in Fig. 8. Stone, cement or composition sills of any kind may be used in this manner. The illustration shows the stone window sill backed up with a hollow tile filler. This is purely for economy, however, as the stone sill could extend through to the inside surface of the wall. The additional depth of stone would add so much to the cost of the sill, though it is less costly and just as satisfactory to use a filler.

In laying up a brick wall, the outer course of brick is generally allowed to project a few inches into the window opening to form a sort of rabbit. In hollow tile construction, special jamb blocks are provided for this purpose. A full jamb block is shown in Fig. 9. They are made for walls of varying thickness, from 6 in. to 12 in. If thicker walls than 12 in. are to be built, these same blocks can be used, breaking joints.

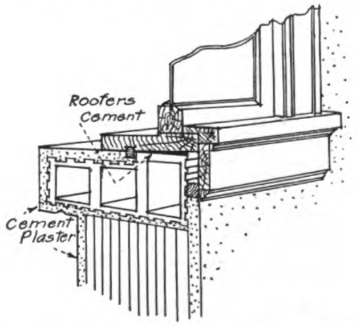


Fig. 7—Window Construction in Hollow Tile

In order to break joints along the face of a wall without cutting tile, half jamb blocks, Fig. 10, are provided. They play the same part that a half brick would as a course starter or closer. Like the full jamb blocks they are made for walls 6, 8, 10 and 12 in. in thickness.

A few words of caution for the careful builder who wishes his work to make his reputation might not be amiss. One is, be sure the window and door frames are so set and sealed that they are not only tight when put in, but will remain permanently tight against wind and rain. Remember all woodwork shrinks. This floor part company when a building dries can be seen by the way baseboard and out. In bathrooms it is the cause of 100 per cent of leaks where water closet and soil pipe come together unless flexible metal-to-metal floor connections are used. It is shown in the cracking of plaster, sticking of doors and numerous other ways.

The United States Department of Agriculture, Division of Forestry, made a very careful investigation of the shrinkage of timber for the benefit of building practice, and the result of their investi-

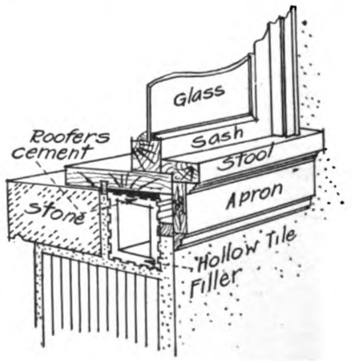


Fig. 8—A Cut Stone Sill Used in Connection with Hollow Tile

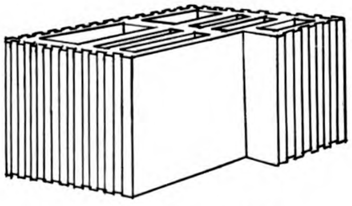


Fig. 9—A Full Jamb Block

gations is condensed in the following table:

TABLE No. 1—SHRINKAGE OF TIMBERS

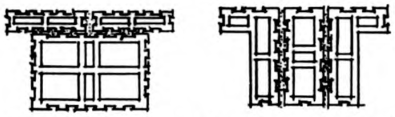
Size of Green or Wet Timber	Amount Lost by Shrinkage	Size or Depth of Timber When Dry
6 inches	.24	5.76 inches
8 inches	.32	7.68 inches
10 inches	.40	9.60 inches
12 inches	.48	11.52 inches
14 inches	.56	13.44 inches
16 inches	.64	15.36 inches
18 inches	.72	17.28 inches
20 inches	.80	19.20 inches

The shrinkage of timber and lumber affects all wooden door and window frames, therefore special care should be taken to thoroughly caulk between all woodwork and hollow tile.

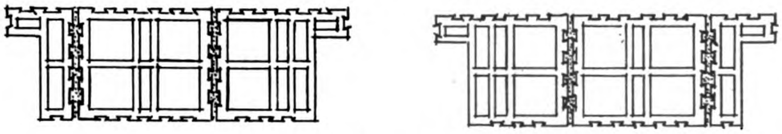
The drip from window sills is of no less importance, at least to the owner. Every builder has seen otherwise beautiful stuccoed houses disfigured by dark stains under the windows where water followed down from the sill, which was improperly designed or installed.

To understand thoroughly the principle according to which window sills should be made, it is necessary first to know something about the action of water when flowing along different surfaces. Try the following simple experiments: Take a pitcher of water and pour it against the outside of a tumbler, Fig. 11. Instead of a tumbler, a piece of sheet metal may be used. It will be found that when the water reaches the lower edge of the tumbler or sheet metal, *provided it has a square edge,* the water will continue to flow downward in its course. If now the tumbler be turned on side, the water will follow the side of the tumbler adhering closely to the glass until it reaches a point where the glass curves upward, when the water will fall to earth. This action of water may be depended upon when in contact *with any surface it can wet.* It will behave differently if the surface be greased, which destroys the attraction.

Applying this principle to building practice, it will be seen that if the under edge of a sill—water-table, belt or other projecting course—is slightly rounded, slopes *toward* the building, or is even level, water will follow along the under surface of the wall, thereby wetting and staining the stucco. If, on the other hand, the under surface of the sill or belt course slopes *away* from the wall, the rainwater will spill clear of the wall and no discoloration will take place.



Figs. 11 and 12—Sections Through Wall Between Window Openings



Figs. 13 and 14—Alternating Courses in Pier Construction

The following practical illustration of how hollow tile is laid around window openings ought to prove interesting to the mason and suggest to him how he can best lay out his work. Fig. 11 shows a short section of wall between two window openings. It will be observed that the windows are so spaced that one full jamb block and one-half jamb block just fill the space. By reversing the jamb and half jamb blocks as shown in Fig. 12, it will be seen that it breaks joints across this short section of wall, the courses, shown in Figs. 11 and 12, alternating with each other.

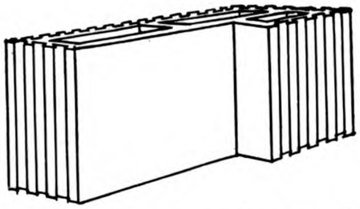


Fig. 10—A Half Jamb Block Used to Break Joints Without Cutting Tile

A simple way of building up a narrow pier or section of wall between two window openings, and at the same time breaking joints so as to maintain the strength of the wall, is shown in Figs. 13 and 14, one large wall block and two thin partition blocks making up one course, Fig. 13, then two half jamb blocks with a thin partition block between makes up the other course, Fig. 14. This form of construction is for spaces too narrow to permit the use of a jamb and half jamb block, reversing them to break joints.

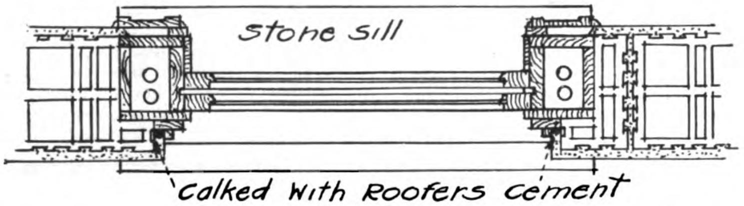


Fig. 15—Plan of Hollow Tile Wall With Window Frame and Sash in Place

In Fig. 15 is shown in plan a section of wall with a window frame and sash in place. This ought to convey a good idea of not only the mason work but likewise the carpenter work of setting the frame and putting on the trim.

Hollow tile caps or lintels for windows and doors deserve special mention. Special arch tile are provided for this purpose, which may be plain or rabitted, as shown in Fig. 16. Whichever type of block is used, however, they could not be used for spans greater than five feet. For wider openings concrete girders faced with tile, or stock tile reinforced with steel and concrete, should be used.

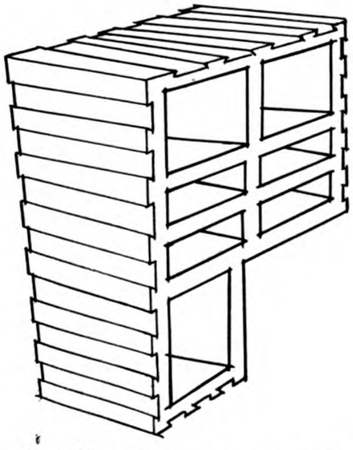


Fig. 16—Tile Lintel for Window or Door Openings

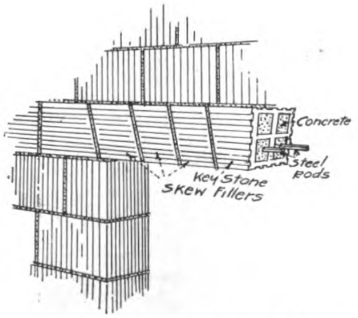


Fig. 17—Reinforced Hollow Tile Arch

A reinforced arch is shown in Fig. 17. It consists of skewbacks at the sides of the opening to form abutments between which a flat arch is sprung, next come filler tile, and in the center of the opening the key block.

The two lower cells of the tile blocks are filled with cement concrete in each of which is embedded a steel rod to take care of the tension in this part of the construction.

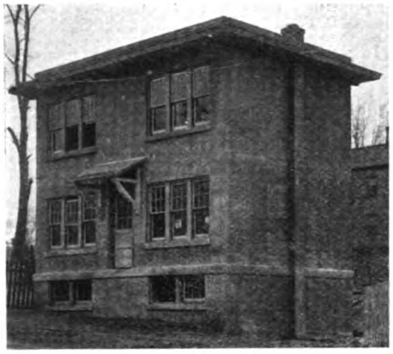
Extra wide openings generally have reinforced concrete girders sprung across them, and the girders are faced with tile.

(*To be Continued*)

Perspective Sketch of 40 Houses Now Being Built at Union, N. J.

A Concrete House for $1,000

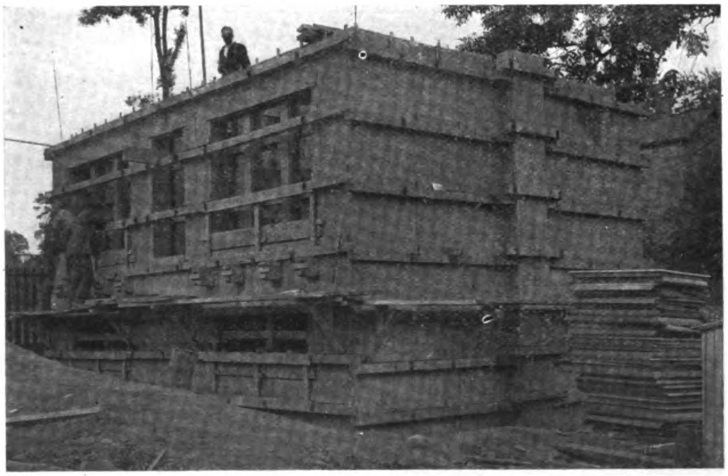
Ingersoll System of Manufacturing Dollar Watches Applied to Building Construction Results in House That Can Be Built for These Figures Under Normal Conditions



Front of the First House Built by This System at South Orange. Steps Have Not Yet Been Added

MONOLITHIC concrete housing construction on a wholesale basis has been the dream of many a man, and numerous efforts have been made to make such a plan workable on a practical basis. The latest attempt along these lines has been made by Charles H. Ingersoll of dollar watch fame. His main idea was to subject house building to the same general principles that govern the making of the dollar watch; that is, to apply to house construction the principles of the cycle of production. In order to admit of this, it was necessary to make the shell of the house in such a way that it could be reproduced over and over again in every detail, thus eliminating all unnecessary work. By standardizing the house workmen could be trained to perform each of the individual operations, and would then be subject to the same speeding up that obtains in the modern factory.

The result of the inventive faculty applied to this problem has resulted in a monolithic concrete house, which, it is said, can be produced in quantities at a cost of $1,000 each under normal conditions and normal prices. Experience under the present abnormal conditions, which of course has resulted in a higher cost, has shown that such a price is entirely feasible.



Forms of the South Orange House in Course of Erection

The chief objection to any wholesale scheme of housing would be the necessary similar aspect of each building. City dwellers are accustomed to living in houses which are exact duplicates of their neighbors, and there seems to be no sound reason why the country dweller should not find the same scheme to his liking. Dissimilarity of appearance, however, is secured in the Ingersoll project by the grouping of the houses, as shown in the perspective sketch which we reproduce.

Rear of the South Orange House

The project was tried out in South Orange, N. J., a house being poured at Valley Street and Hixon Place. Ideas of long theoretical standing were there put in practical application and modified as circumstances seemed to require. After the forms were thoroughly tested and tried out, the originators decided to build

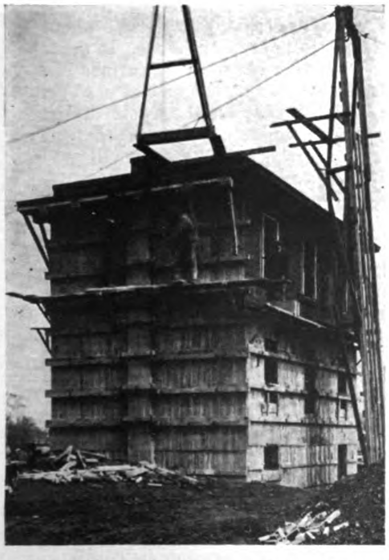
The Houses at Union in Course of Construction

forty houses on Morris Avenue, Union, N. J., in order to further develop the cycle of production in each department that enters into the construction of this type of building. These houses were to be laid out as shown in the accompanying ground plan and perspective sketch. One of the photographic reproductions shows the houses in course of erection.

Concrete was adopted as the material of which these houses were to be built because of its peculiar adaptability to the scheme in hand. The organization states that the average person has been prejudiced against concrete by the fear of dampness. It states that this has been caused by a lack of insulation and not by the lack of proper waterproofing. This is evidenced by the well-known fact that when the outside temperature is lower than the inside, moisture will condense, as on a pane of glass which is absolutely waterproof. No waterproofing will correct this condition. In order to prevent dampness in the house, the inside walls are furred out so as to leave an air space between the plaster and outside wall.

The first thing that was considered was the proper material for forms. Steel forms were eliminated because of their weight, which would render it difficult for one man to handle sections of any size. Laminated wood was selected as giving the most efficient results. It is expected that the upkeep for the wood forms per house will not exceed $10, and indeed four houses have already been poured with the one set of forms and there is no sign of deterioration of the wood.

The manner in which the forms are constructed is interesting. The wooden posts are erected and well trussed. These bear the entire weight of the building. From these posts are hung the wooden surface which come in contact with the concrete, and which are subject only to hydrostatic pressure, that is, the only weight that the surfaces in contact with the concrete bear is the pressure due to the weight of the concrete in that particular mold itself.



Taking Down the Forms From One of the Houses at Union

The design meets the requirements for the producing of an even thickness of the walls, perfect plumb and alignment, and the reproduction of the same interior and exterior dimensions in every case.

A Tar Pot in the Kitchen Caught Fire, Emphasizing the Value of This Type of Construction, as the House Was Uninjured

An interior rigid framework for the two stories is first erected. This framework consists of columns continuous throughout the different stories and held in their positions rigidly by trusses. On this supporting framework are hung the forms which mold the concrete of the outside and inside walls, the floor and roof construction, the cornice, etc. These forms were designed to fit and reproduce the house that had been decided upon as a standard, and were fabricated to meet the requirements of wholesale reproduction. The making of non-interchangeable forms makes it possible to reproduce this house over and over again, absolutely without variation.

Each piece of form work is designed to perform a certain operation, and bears a code mark which designates its proper place. The code is very simple. As each piece is marked, the only skill needed in erecting the forms is the learning of the code. This enables the entire operation to be accomplished by means of common labor. In the photographs which we reproduce the code can be plainly seen on the forms. The forms are kept from bulging by means of iron bars which extend through forms and wall. Wooden separators are placed between the inside of the forms, so that the entire structure is absolutely rigid before any concrete is poured. The iron tie-rods are provided with a hemispherical shaped piece of iron which rests next to the forms. When the forms are taken down this hemispherical shaped piece of iron is removed and the tie is cut off. The small hole left is then plastered. The wooden facing blocks are also left in the wall, being plastered over in the same manner as are the tie-rods.

There are no bolts or other means of taking up discrepancies that are usual in erecting any type of interchangeable single piece lumber forms. Every piece has its allotted place, and where it is not self-locking it requires only the driving home of a wedge in order to bring it to its true position.

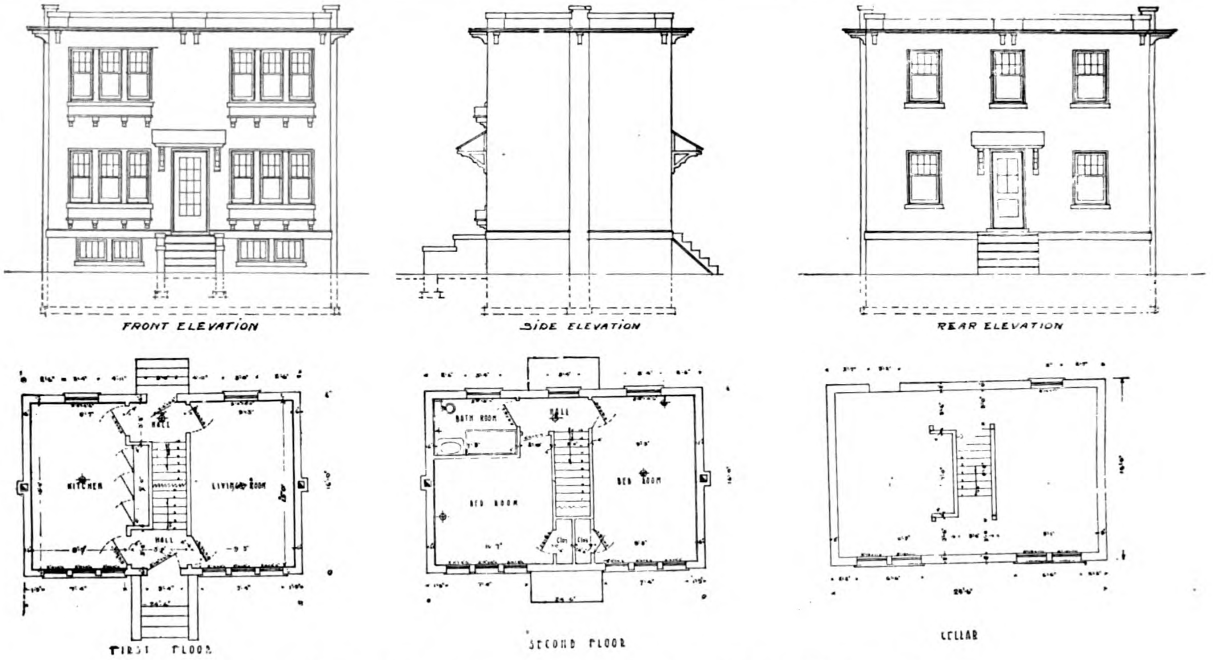
All other materials entering into the completion of the house are sent to the job cut to the right length and properly coded as to position. They can be placed without the necessity for the working out of any problem in carpentry, or any other trade. This eliminates waste in the completion of the building.

Reinforcing is placed in the form before the house is poured. The vent and soil pipes, electric conduits, metal flue lining for the chimneys, window frames, door bucks, furring strips, nailing blocks, etc., are all set in place before the concrete is poured. Water supply pipes are exposed, plumbing being modern in every respect.

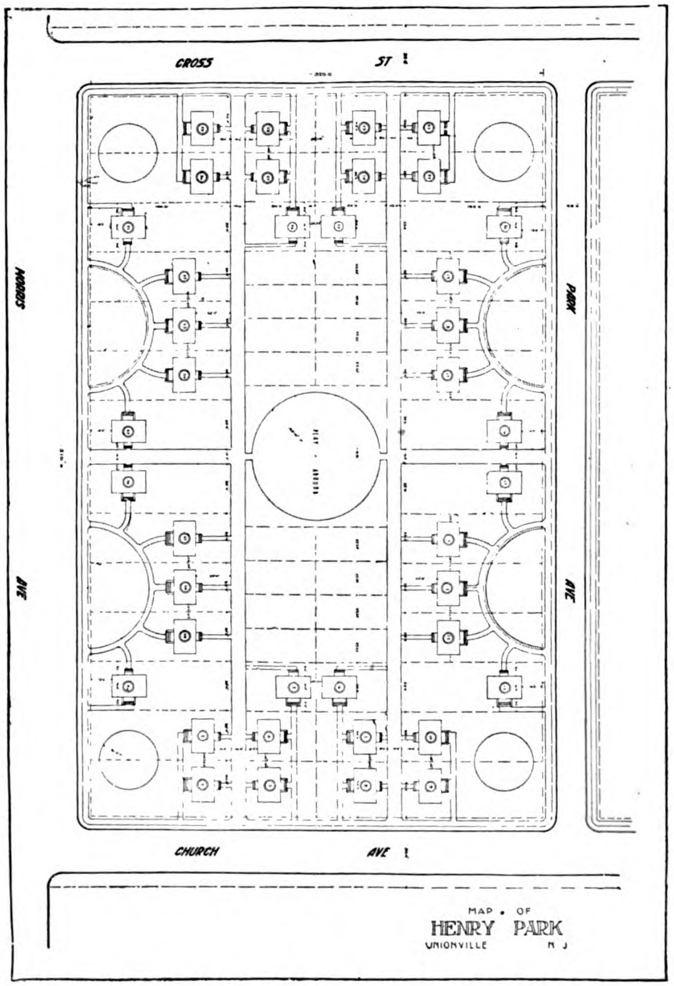
The concrete is poured in through window or door openings on the lower story, thus eliminating the danger of separation of the aggregate from the cement, which would be liable to occur if the concrete for the entire house were poured from the roof.

The shell is a monolith of reinforced concrete. It is made up of outside walls, interior partitions, beams for the floors and roof, flat arches spanning between beams, chimneys, cornice and parapet.

The exterior can be either covered with stucco or the form marks can be removed by means of the Berg Rotary finisher. Then the hoods for the front and rear doors are attached, also the front and rear steps. The roof is made watertight by the application of a coat of hot asphalt. This is all that is necessary for the finishing of the exterior of the house. On the inside the walls are furred and



Plans and Elevations of House Chosen as a Standard for Wholesale Erection



Ground Plan of Houses in Course of Erection at Union, N. J.

lathed. Either wood or metal lath can be used; this is then plastered. Wood sleepers and floors are laid, the stairs are set, and the sash and doors are hung. The plumbing fixtures consist of a lavatory, bathtub and water closet in the bathroom on the second floor and a sink in the kitchen. The trim is then set and painted as desired. This completes the interior of the house.

It is planned to use cypress trim finished natural, the floors being of North Carolina pine. The bathroom is intended to have a white cement wainscot and cement floor. The doors are intended to be of fir, stained natural and varnished at completion. Hardware consists of an ornamental front door set, an iron lock for the rear door and wood knobs on interior doors.

It is estimated that it will take about seven hours to pour each house. It takes about 3 days to erect a set of forms. The forms are removed at the end of a week. It is estimated that on the basis of the work done on the self Masters Tract, at Union, N. J., each set of forms will produce at the rate of 40 houses a year.

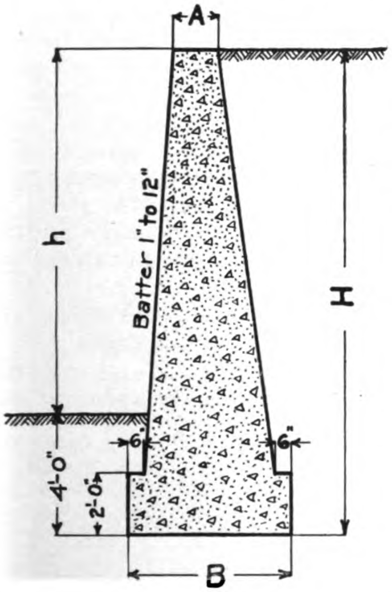
The organization says that there are no limits to the size or height of the house. In order to get the greatest economy the one design should be reproduced as much as possible, thus reducing the cost of the forms for each house. And as the window frames, plumbing and other items can be purchased cheaper in quantity, there is a greater saving by the use of a standard design.

The organization is at present engaged in perfecting the cycle of production, and is not attempting a speeding-up process until this is perfected. As soon as cost records and time of erection are thoroughly established, we will describe these parts of the operation in detail.

How to Design a Retaining Wall—I

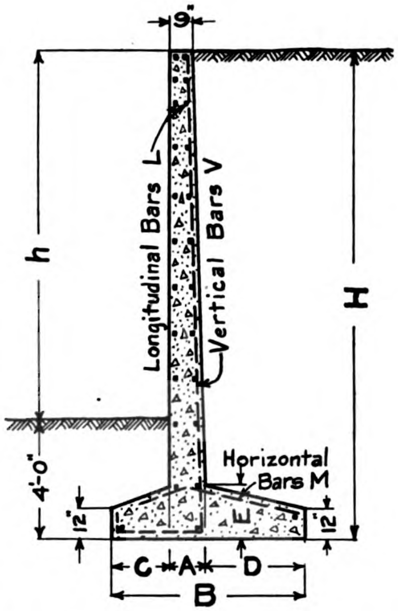
By L. Goodman, C.E.

THE type of retaining wall to be adopted is the ever-present problem when planning such wall for confining an earthen embankment for a road or street laid out in a cut, approaches to bridges or viaducts, or for any other of the innumerable purposes for which they are required.



The following designs give a comparison of the dimensions and materials required for gravity concrete walls, in which the earth pressure is resisted by the weight of the wall, and reinforced concrete walls which have a thin vertical stem attached to a horizontal base. The gravity walls must be made sufficiently heavy to prevent overturning, mainly by their own weight, while in reinforced concrete retaining walls a part of the retained material is used to prevent overturning.

The designs are based on the earth surface level at top of wall. The weight of concrete is taken as 150 lb. per cubic foot, earth at 100 lb. per cubic foot and the angle of repose of earth is assumed at 35 deg. Rankines' earth pressure formula was used for investigating the designs, and the recommendations of the Joint Committee on Concrete and Reinforced Concrete were used as a basis for the detailed design of the reinforced concrete retaining walls.



The tables give the dimensions and the materials required per lineal foot of wall. By filling in the cost of materials and labor as they are found in each locality a fair estimate of the cost per lineal foot of these walls can be obtained and used as a guide in the selection of the type to be used.

The method of designing a reinforced concrete retaining wall will be given in our next issue.

ESTIMATE OF QUANTITIES PER FOOT OF WALL

Gravity Wall 1:3:6 Concrete					Reinforced Concrete Wall 1:2:4 Concrete					
Height Above Ground h, Ft.	Concrete, Cu. Yds.	Cement, Bbls.	Sand, Cu. Yds.	Stone, Cu. Yds.	Height Above Ground h, Ft.	Concrete, Cu. Yds.	Cement, Bbls.	Sand, Cu. Yds.	Stone, Cu. Yds.	Steel Reinf., Lbs.
6	0.93	1.00	0.43	0.86	6	0.40	0.63	0.18	0.35	36
8	1.28	1.40	0.59	1.18	8	0.48	0.75	0.21	0.42	60
10	1.74	1.91	0.80	1.60	10	0.63	1.00	0.28	0.56	70
12	2.67	2.94	1.23	2.48	12	0.80	1.25	0.35	0.70	96

DIMENSIONS OF RETAINING WALLS

Gravity Wall				Reinforced Concrete Wall											
Height Above Ground h Ft.	Total Height Wall H Ft.	Thickness at Top A In.	Width of Base B Ft.-In.	Height Above Ground h Ft.	Total Height Wall H Ft.	Thickness Vertical Wall A In.	Width of Base B Ft.-In.	Outer Cantilever C Ft.-In.	Inner Cantilever D Ft.-In.	Thickness Base E In.	Vertical Bars V		Horizontal Bars M		Longitudinal Bars L, Size
											Size	Spacing	Size	Spacing	
6	10	15	4—0	6	10	9	4—0	1—0	2—3	12	½	8	½	12	⅜
8	12	15	4—9	8	12	9	4—9	1—3	2—9	12	½	4	½	6	⅜
10	14	18	5—6	10	14	12	5—6	1—4	3—2	14	⅝	6	⅝	9	½
12	16	18	6—6	12	16	14	6—6	1—8	3—8	16	⅝	4	⅝	8	½

NOTE.—All bars square deformed; sizes and spacing are in inches.

A Dutch Colonial House Suitable for a Small Family

THE Dutch Colonial house, with its sturdy, graceful lines, and spacious second story, has always enjoyed considerable popularity in various sections of the country. In Westchester County, N. Y., the Dutch Colonial influence is especially strong, and many of the houses built by development companies there are of this popular type.

One of the most attractive small Dutch Colonial houses in Westchester County is shown on the accompanying colored insert. The main section of the house measures only 28 ft. by 22 ft., and yet is so planned as to give a feeling of spaciousness inside.

The exterior has an interesting detail in the spacing and arrangement of windows on the first story. The living room windows are placed 3 ft. 3 in. from the living room floor, a flower box supported on brackets finishing the exterior of the windows. The dining room windows are only 2 ft. 3 in. above the level of the inside floor, and constitute a triplet which contrasts well in mass with the two windows of the living room and the flower box.

The house has typical Colonial clapboards painted white and exposed about 8½ in. to the weather.

The lower section of the gambrel roof is broken so as to extend out in a slight overhang, which constitutes one of the charming features of the roof. The roof is covered with shingles of a weathered green color.

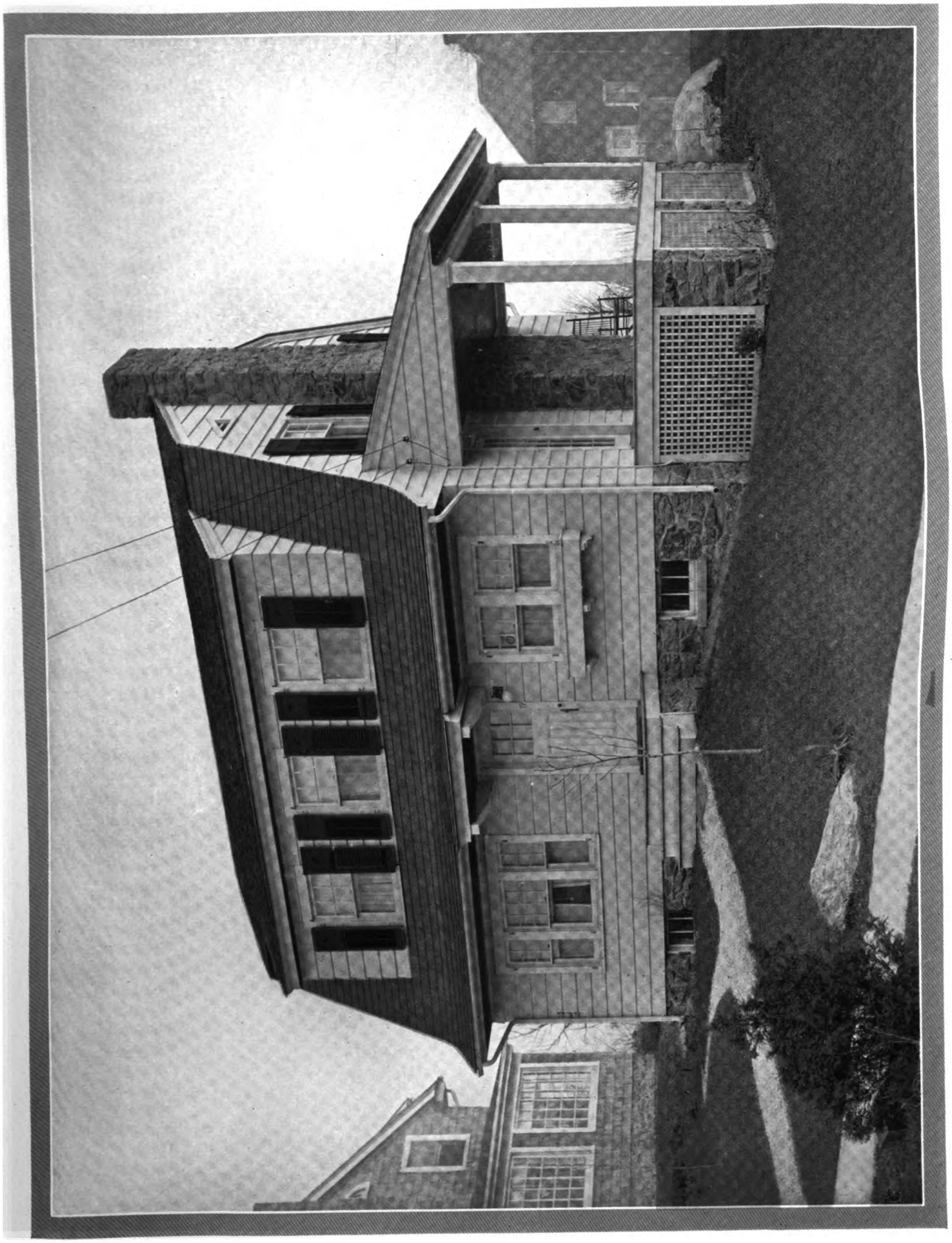
The overhang of the roof and porch ceiling is ceiled with North Carolina beaded pine. The porch floor is of 3½ in. stuff painted grey. The porch columns are of ⅞ in. stuff boxed in. The brackets over the front door are built up of 1⅛ in. stuff.

The foundation walls and chimney are built of selected local fieldstone.

All exterior trim is painted white, the shutters being painted the usual Colonial green.

The Living Room

The Dining Room Looking from the Living Room



The Kitchen.
Notice the 36"-high sink

Entrance from the exterior is had directly into the living room, the main feature of which is a large fireplace built of fieldstone pointed with grey cement. The hearth is of grey cement marked off into 6 in. squares. The fireplace mantel is built up of ⅞ in. stuff.

The dining room is semi-separated from the living room by means of a cased opening.

The interior trim throughout is painted white, doors, handrails and treads being of mahogany finish. The risers are painted white.

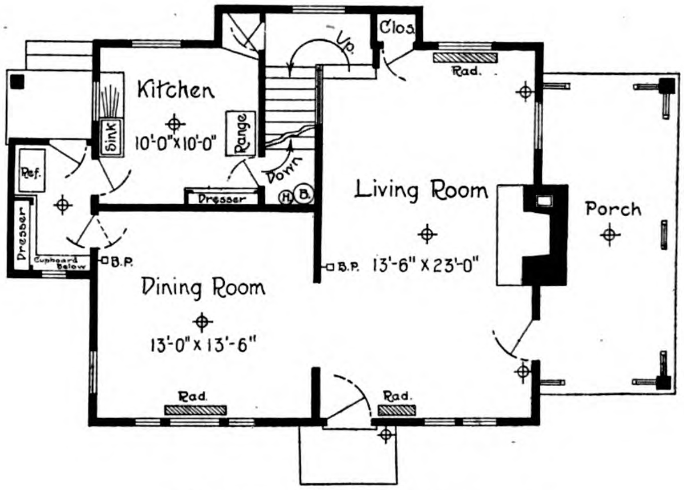
The stairs are interestingly placed in the living room, of which they form an inconspicuous part. The stairway is a combination affair, opening from a landing and down two steps into the kitchen, as is the popular custom in small houses where it is desirable to economize stair space to the utmost.

The kitchen has a sink 36 in. high, conveniently placed under a window so that plenty of light is afforded. A gas range is used for cooking. A built-in dresser is conveniently placed.

The arrangement of the kitchen entry is unusual and worthy of notice. It contains a dresser and refrigerator.

The second story contains four bedrooms and two bathrooms, which latter number are unusual in a house of this size. The two bathrooms are so located as to afford an economical running of the piping in conjunction with that of the kitchen.

Each of the bedrooms is so arranged as to afford plenty of wall space, which only too often is sacrificed in small houses.



First Floor Plan. Scale, 3/32" = 1 ft.

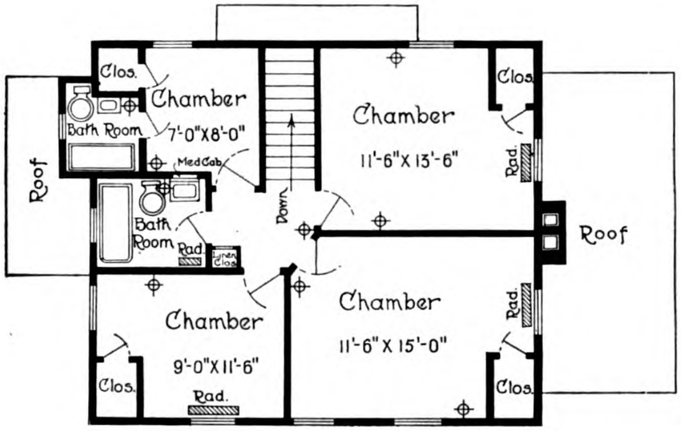
Rear of the House

Lighting is by means of electricity, the fixtures being of a gold finish. The lighting fixtures in the center of the rooms are of a semi-indirect type.

Floors throughout are of 2½ in. North Carolina pine, being laid double with building paper between the rough and finished floors.

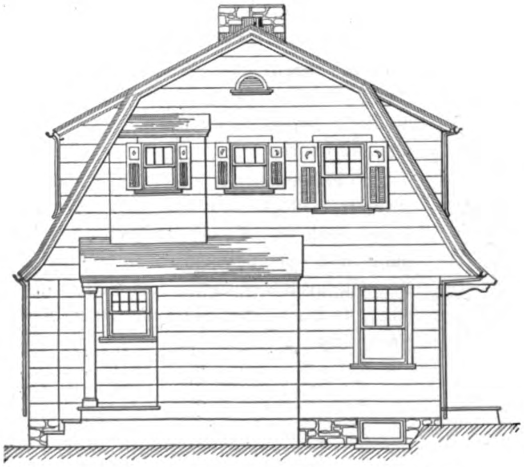
This residence was constructed for **Mr.** Haylett O'Neil, 19 Summit Avenue, Larchmont, N. Y., in accordance with plans and specifications prepared by **L.** Resnick, architect, of the Leo Bugg Company, 40 East Thirty-second Street, New York City.

Front Elevation. Scale, 3/32" = 1 ft.

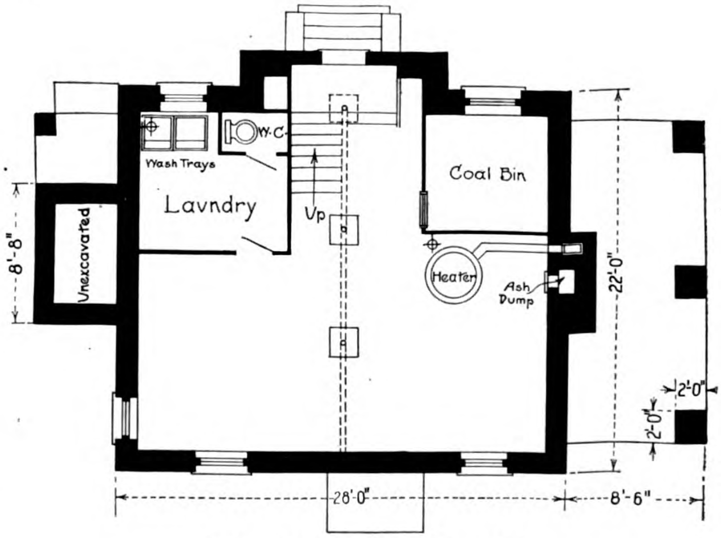


Second Floor Plan. Scale, 3/32" = 1 ft.

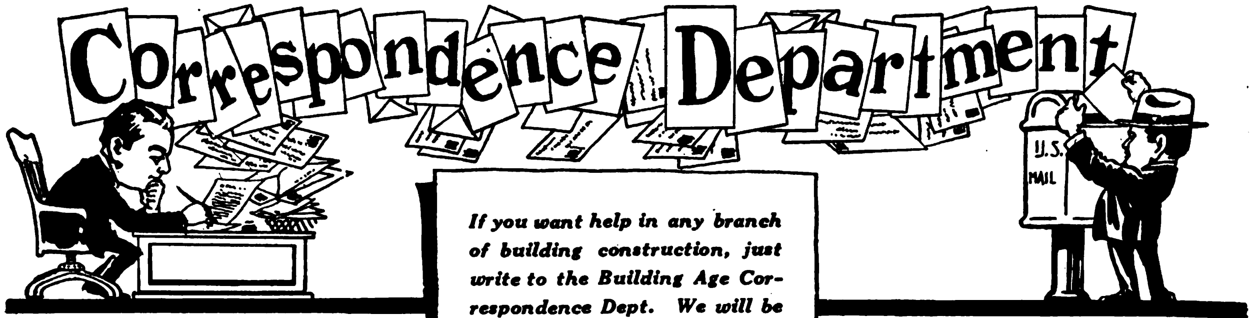
Right Side Elevation. Scale, 3/32" = 1 ft.



Left Side Elevation. Scale, 3/32" = 1 ft.



Cellar Plan. Scale, 3/32" = 1 ft.



Correspondence Department

If you want help in any branch of building construction, just write to the Building Age Correspondence Dept. We will be glad to answer all your questions without charge.

Questions should be confined to construction only, as the editors cannot undertake to design structures.

All readers are invited to discuss the questions and answers published.

How To Find Proper Sizes of Wood Beams

From W. V. Karr, Westfield, Mass.—In the March issue of BUILDING AGE there is an article by Mr. W. A. Giesen entitled "How to Find Proper Sizes of Wood Beams for Various Spans," in which I have been very much interested. I know how to find proper sizes, but to find them all ready worked out is like money from home.

Through the correspondence columns I would like to inquire of Mr. Giesen if in figuring the loads on floor joists the weight of a plastered ceiling was added, or if any deflection was considered? A total floor load of 60 lb. seems rather light. We usually figure 70 lb. live load per square foot of floor in residences around here, and add the weight of floors and ceiling to that.

I have in mind a living room 14 ft. in the clear, with bedroom above; 2 x 8 in. joists were used 16 in. on centers and every fifth joist doubled. The plaster cracked badly and a large portion of it fell off. So it would seem better practice to use 2 x 8 in. spruce joists 16 in. on centers on a span of 14 ft. in residence work and not have to double any joists.

Please do not consider this as a criticism, for my only purpose is to make the articles in BUILDING AGE of the greatest possible value to the readers, one of which I have been for at least twelve years, and have no sympathy with the man who is able to write an authoritative article but will not, but is ready to criticise the one who does venture to write an article.

Answer, from W. A. Giesen, architect: I am going to answer your letter a little more fully than probably you had intended that I should. This, in order to clarify the tables, which you referred to in your letter to the BUILDING AGE, as the information herein given may be of help to the readers of the paper, that being my only incentive in the writing of articles which I publish.

Tables 3 and 4, as published in the March issue, give the strength of what wood beams of a specified size will carry on a given span spaced 16 in. on centers. The weights given in tables 3 and 4 below the span in feet are the safe uniformly distributed loads the joists will carry per square foot, and from these weights the dead load or weight of construction must be deducted, the remainder being safe live load.

For example, let us take 2 x 8 in. spruce beams. I am taking these as they happen to be the ones which you mentioned in your letter. Two x 8 in. spruce beams on a span of 14 ft., 16 in. on centers, are good for a total load of 65 lb. per square foot on the span in question; deducting 20 lb., which is dead load, consisting of weight of floor joist, under-flooring, flooring and plaster, we still have 45 lb. left or the live load the joist will carry, which is more than sufficient for residence work.

You stated that a floor load of 60 lb. seems rather light. In this I presume you refer to spans under the heading of residence buildings, tables 1 and 2, which only call for a 60-lb. total load or a 40-lb. live load. The live load of 40 lb. is light, but that is all that is required by the New York building laws, and the tables were calculated in accordance with their requirements, which requirements I believe are the equivalent, if not better, than those of other important cities. As a matter of fact I don't believe that the floor of the dwelling would ever be loaded to a full live load of 40 lb., much less 70 lb., which you state is the loading used around Westfield, and further, I do not think an architect does justice to his client when he uses heavier material than that necessary to accomplish the result with price of lumber as it is to-day.

In regard to deflection, I will frankly tell you it was not taken into consideration by me when I calculated the tables as published. They are figured for strength only, as it is a hard matter to determine just where to draw the line in the calculation since it takes little variation in the class of material that we get to upset the theory of deflection entirely. I did not think it necessary to indicate which beams would be liable to crack plastered ceilings, as architects, carpenters, etc., with any experience at all would not think of using shallow beams, such as 6 in. and 7 in. beams, indicated on the long spans.

To satisfy myself in regard to the trouble you have had, I have calculated the deflection on the size of beams, which you in your letter stated caused the plaster on the ceiling to crack, and found it so little in excess of that allowable that it was negligible. So that so far as 2 x 8 in. beams are concerned on the spans mentioned there would be no trouble, according to formula, if the material was right and the beams uniformly loaded. Therefore I believe that the trouble was not caused by using beams as recommended in the tables, but really caused by the partitions on the second floor, which from your letter I take it caused a concentrated load on the beams, in addition to the uniformly distributed load. A certain portion of the roof load was also probably transmitted down to the beams, and this being the case I am not surprised that you had trouble with your plaster and an excess of deflection.

With conditions such as you describe, concentrated loads on the beams must be taken into consideration as well as the uniform loading. Should you at any time desire any additional information I shall be pleased to have you write me, and I will endeavor to give you a proper answer.

From G. B. W., Architect, Glen Ridge, N. J.—In glancing over your correspondence column—May number—I was interested in C. S. C.'s—architect, Mass.—criticism of tables of "The Strength of Wooden Beams," published in one of your earlier editions.

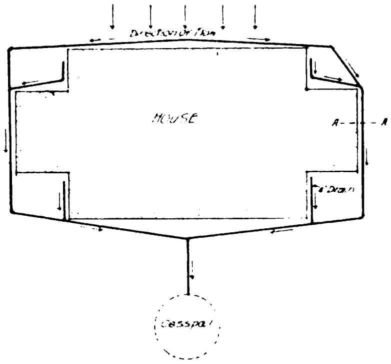
I have checked up the values given, comparing them with those given by a number of standard authorities, and also used these tables in designing some residences in Brooklyn, N. Y., using 2 x 8 beams on maximum span. The Bureau of Buildings passed this construction without comment.

These values also check up with the U. S. Government Standards—"Government Engineer's Manual." I think C. S. C., must have made a miscalculation, or that he is superconservative.

Waterproofing a Damp Basement

From W. H. Y., Berkeley Springs, W. Va.—I have been taking a copy of your monthly magazine for several years, and note your subscribers are entitled to any

information they desire from your expert engineer. Now I have quite frequently noted articles on damp proofing of cellars and basements in your book, but I am now writing you on a special matter, and trust you will give it prompt attention. I recently erected a fine country residence here, which is built with hollow concrete walls from the level of the basement floor. Now, in building the home we had to excavate right down through hard limestone and pockets of clay the whole depth of the story 9 ft. The house is built at the foot of a small hill. When building it we struck several strong streams of water at the rear wall, so we used 1-2-4 mix and also a waterproofing compound to keep open water from penetrating the walls. When the building was new the water would penetrate it, but as I was only the builder and was under the higher man, we built it his way. Since then it has turned out to let the water penetrate the whole new walls. The owner has tried several things to prevent it, but has not been able to do it. Now, to get down on the outside of his house to build a separate retaining wall will be impossible because of existing circumstances. Now the owner has asked me to take this problem up with you and ask as a special favor to give us your very best advice what can be done to overcome the trouble I have. My ideas he has but we want yours, and both of us will greatly appreciate your advice what can be done to positively overcome this trouble. This house cost about $35,000 and is a beautiful home, but the water is ruining the basement story and must be remedied.



Arranging Tile Drains To Carry Off Water

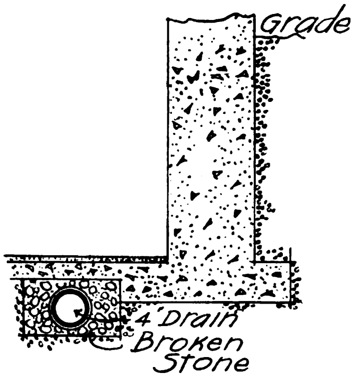
Answer—My sympathies are with a man who is unfortunate enough to build an expensive house, only to be troubled with the meanest condition to be contended with, and that is the wet basement or cellar.

I have carefully digested the contents of your letter, and after looking at it from every angle, I believe that I can solve the problem.

It surprises me that with water visible at the time you were proceeding with the work adequate precautions were not taken to waterproof the walls by means of one of the various methods known to be reliable. My suggestions would be as follows:

Excavate at rear wall and around house a trench as narrow as possible. This to be as close to the outside walls of the house as is convenient, the closer the better. The bottom of trench should be below the top of finished cellar floor at the high point, which I presume is the rear, and run at a pitch to the low point, somewhere at the front of the house. When this is done, lay tiled drain pipe with open joints at a pitch to the front, and on top of these and around same lay 2-in. broken stone to within 36 in. of grade level. From the low point of trench excavate another trench connecting with the one around house. This to run at a direction down grade until it discharges in a blind drain, or where proper seepage can be obtained.

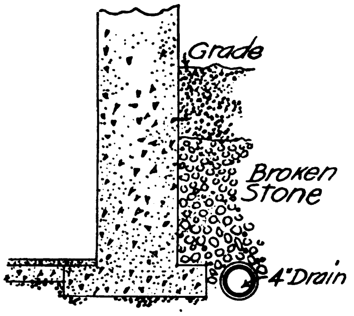
With the above method the water will have no chance to lay against walls and work through, as it would be immediately conducted down through the blind drain and tile and carried off through same to the blind cesspool or at place where seepage is possible.



Drain Placed Inside of Foundation Wall

Another method which would probably be not so expensive would be to excavate on the inside of all cellar walls below the floor level and lay tile drains with open joints. After this has been done relay floor. Attention is called to the fact that the tile drain should have proper outlet or place for the discharge of the water as it accumulated, such as blind cesspool or proper seepage. Should this not prove adequate the next step to be taken, in conjunction with the above, would be as follows:

The entire cellar floor, walls, etc., on the inside would have to be thoroughly cleaned and roughened, and on this a coating of cement and sand, into which is incorporated a reliable and guaranteed waterproofing compound, would have to be applied.



Section Through Foundation Wall, Showing Position of Tile Drain

Should you decide to use the latter method it would be very essential for you to give the work to parties who make a specialty of this kind of work, and not pay them any money until such time as the work is proven satisfactory to you. In addition to this, I would advise that you get a year's guarantee in writing.

W. G.

What Floor Construction in Room Over Porch Will Keep Room Warm?

From G. E., New Jersey.—Last summer I built a house something like that shown on page 136 of the March issue. The last winter, which was very cold out here, made the room over the porch very cold in spite of lots of heat coming from the register. What I would like to know is how I could prevent cold air from coming up through the floor which extends over the porch.

The owner of the house wants me to fix this room up so that he can keep it warm.

Answer—The condition referred to is an everyday complaint with rooms such as one you mention and one which can be readily remedied in many ways, a few of which I will mention in my recommendations as to how to overcome it.

What I would suggest be done is as follows: Remove the finished floor and under floor, if any, and nail 1 x 2 in. cleats to the sides of the floor joist, the bottom of the cleats being kept about ½ in. above the bottom of the beams. Then if any slight settlement should take place due to tamping cinder concrete in position, it would not have the tendency to push down the porch ceiling.

On top of cleats and between beams lay ⅞ in. thick spruce or North Carolina pine, tongued and grooved sheathing or roofing to receive deafening. It is quite important that tongued and grooved sheathing be used as its use will prevent the concrete or deafening from dropping down or running on top of porch ceiling boards.

Not knowing the exact structural conditions of your room, I am going to specify three different fills for use on deafening boards, either one of which should be used, depending on the severity

of the condition. They might be tabulated as follows:

No. 1—For severe condition use cinder concrete.

No. 2—For intermediate condition use sawdust.

No. 3—For mild condition use hair felt.

Should the condition be severe, lay on deafening boards 3 in. of cinder concrete well tamped in position, but laid not too wet. Cinder concrete should be mixed in the proportions of one part cement, two parts sand, and five parts of clean hard coal steam cinders.

The space between top of concrete and under side of plate or between studs to the top of floor beams at outer walls should be solidly filled, as this is a likely place for cold air to get in. Concrete or brick can be used for that purpose.

For condition No. 2 merely lay 3 in. of sawdust or mineral wool on top of deafening boards. But fill around outer walls as before described.

Condition 3 would require 1 in. of hair felt tacked on to the deafening boards or it might even be tacked on to the top of porch ceiling boards. Care should be taken, if hair felt is used, to tack it well into position. Fill around outer walls, between studs, etc.

After you have decided which fill is necessary and it has been placed in position, lay back the under flooring, the joints should be as tight as possible; on top of under flooring lay two layers of building paper and on the paper lay the finished floor.

We now have a construction composed of porch ceiling, 2½ in. air space, ⅞ in. foundation for deafening, 3 in. of fill or hair felt, another air space of approximately 1½ in., under flooring, paper and then the finished floor.

With a floor constructed such as this there is no question as to being able to heat the room. W. G.

How Can Shaky Floors Be Stiffened?

From E. C., New York.—Will some reader kindly suggest way to stiffen floors of an old residence? They are now shaky as one walks across them. The spans are about 16 ft. and the beams 2 in. x 8 in.

Answer—Shaky floors such as you describe in your letter are quite frequent in old residence buildings and may be due to several different causes, one of which undoubtedly is the long span for the size of the beams used. Another cause would be lack of proper bridging. You did not state in your letter what spacings these beams were used on, but I presume they are spaced 16 in. center to center.

What I would do in your case, and I have cured similar floor troubles in the way hereafter described, is as follows:

First, determine by removing piece of existing flooring whether the beams are bridged. Very often in old buildings they are not. Should they not be, the thing to do is to remove the flooring so much as necessary to place in position three rows of wood bridging from front to back.

Bridging should be accurately cut and fitted and well nailed in position. Would refer you to article on bridging in April issue of BUILDING AGE for complete information on bridging.

After the bridging is placed in position test the floor. If still shaky, proceed as follows: Renail all of the present flooring from the top to the floor joists. One ten-penny nail should be driven into each bearing.

After you have finished with this lay new ⅞ x 2¼-in. tongued and grooved flooring on top of existing floor. New flooring should be laid at right angle to the present floor, and blind nailed well with eight-penny cut nails, one every 10 in. I am positive that should you proceed as I have suggested you will have no further trouble from shaky floors. W. G.

A Question on the Trade Acceptance

From R. W. B., Youngstown, Ohio.—I have read with interest your article on Trade Aceeptances in the April issue of BUILDING AGE, but there is one paragraph as follows:

> "It will put a stop to the practice of taking unearned discounts, a petty, unfair practice by no means uncommon."

This is one point in connection with trade acceptances that has rather bothered me, and I do not see just how this will put a stop to the practice of taking unearned discounts, and if not asking too much, will you kindly give me your reasons as to why this practice will be stopped with the use of the trade acceptance.

Answer.—The practice in question is that of taking time beyond that allowed by the terms of the discount, i. e., many are in the practice of deducting the discount when payment is made quite a little time after the discount period has expired. Of course, much will depend upon the length of time for which the discount is allowable in breaking up this practice. In some lines the terms of discount are limited to ten days, while others extend the period to thirty days, or longer. The giving of a trade acceptance controls the time of payment.

Let us suppose that merchandise is purchased subject to a discount if paid within thirty days, or if paid on a certain day of the month following the purchase, as is the practice with some firms. If the sale is made on the open account the buyer does not have to pay on a particular date. He can pay several days later and deduct the discount. I have known cases where large firms would deduct the discount twenty or thirty days after expiration of the discount period.

If the above purchase is settled by the giving of a trade acceptance, less the discount allowed, the buyer will have to meet the payment when it is due. The taking of additional time would be possible only by renewing the obligation, and in doing this he would lose his discount.—E. L. Seabrook.

How to Quickly Figure Amount of Materials for Concrete Work

From W. G., Glendale, Ky.—How can one figure on the amount of materials needed for concrete work for different propositions?

Answer.—The following table will prove very convenient in figuring up the quantity of sand, cement, and stone required for any number of cubic yards of concrete. The simplicity of the table will reduce the chances of error to a minimum. It is self-explanatory with a sample problem worked out below. W. G.

TABLE SHOWING HOW TO QUICKLY OBTAIN AMOUNT OF CEMENT, SAND AND STONE FOR VARIOUS MIXTURES OF CONCRETE WHEN ANY NUMBER OF CUBIC YARDS IS TO BE LAID

1:1½:3				1:2:3				1:2:4				1:2½:5				1:3:6			
Cu. Yds. of Concrete	Bbls. of Cement	Cu. Yds. of Sand	Cu. Yds. of Stone	Cu. Yds. of Concrete	Bbls. of Cement	Cu. Yds. of Sand	Cu. Yds. of Stone	Cu. Yds. of Concrete	Bbls. of Cement	Cu. Yds. of Sand	Cu. Yds. of Stone	Cu. Yds. of Concrete	Bbls. of Cement	Cu. Yds. of Sand	Cu. Yds. of Stone	Cu. Yds. of Concrete	Bbls. of Cement	Cu. Yds. of Sand	Cu. Yds. of Stone
1	1.91	.43	.86	1	1.74	.52	.77	1	1.50	.45	.90	1	1.24	.46	.92	1	1.06	.47	.94
2	3.82	.86	1.72	2	3.48	1.04	1.54	2	3.00	.90	1.80	2	2.48	.92	1.84	2	2.12	.94	1.88
3	5.73	1.29	2.58	3	5.22	1.56	2.31	3	4.50	1.35	2.70	3	3.72	1.38	2.76	3	3.18	1.41	2.82
4	7.64	1.72	3.44	4	6.96	2.08	3.08	4	6.00	1.80	3.60	4	4.96	1.84	3.68	4	4.24	1.88	3.76
5	9.55	2.15	4.30	5	8.70	2.60	3.85	5	7.50	2.25	4.50	5	6.20	2.30	4.60	5	5.30	2.35	4.70
6	11.46	2.58	5.16	6	10.44	3.12	4.62	6	9.00	2.70	5.40	6	7.44	2.76	5.52	6	6.36	2.82	5.64
7	13.37	3.01	6.02	7	12.18	3.64	5.39	7	10.50	3.15	6.30	7	8.68	3.22	6.44	7	7.42	3.29	6.58
8	15.28	3.44	6.88	8	13.92	4.16	6.16	8	12.00	3.60	7.20	8	9.92	3.68	7.36	8	8.48	3.76	7.52
9	17.19	3.87	7.74	9	15.66	4.68	6.93	9	13.50	4.05	8.10	9	11.16	4.14	8.28	9	9.54	4.23	8.46
10	19.10	4.30	8.60	10	17.40	5.20	7.70	10	15.00	4.50	9.00	10	12.40	4.60	9.20	10	10.60	4.70	9.40

Problem: How much cement, sand and stone will be required for 263 cubic yards of a 1:2½:5 concrete?

In the table of 1:2½:5 mixes, find opposite 2 cubic yards 2.48 barrels cement required. Multiply by 100, which gives 248 barrels. Opposite 6 cubic yards, 7.44 bbls. required. Multiply by 10, giving 74.4 bbls. Then opposite 3 cubic yards find 3.72. Add these three quantities as below:

248.+74.4+3.72=326.12 barrels of cement required for 263 cubic yards.

The quantities for sand and stone are figured in the same manner.

Some Hints On Wood Bridging

From C. J. M., St. Johns, Nfld.—In the May issue of BUILDING AGE, William A. Giesen, Architect, has an article entitled "Some Hints on Wood Bridging and Its Importance." With the reading matter of this article I have no fault to find, as it is correct, to the point and easily understood, which should be the quality of every article that is intended for enlightenment.

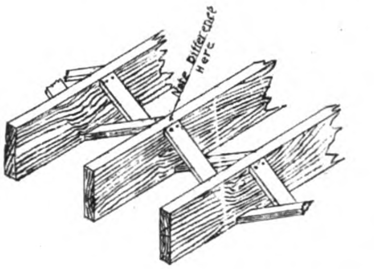
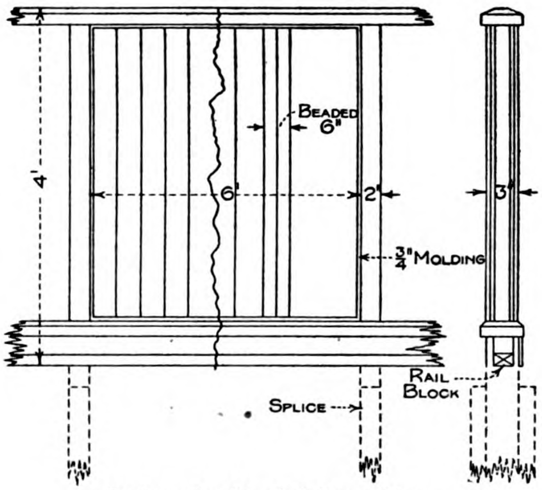


Fig. 1 of this article, however, which is termed "the proper method of placing bridging," is, I would say, the very reverse of proper and certainly needs correction. This may be easily seen by comparing the figure as it appears in the article with the inclosed sketch, which shows the pieces bearing one against the other, while in Fig. 1 of the article they show bearing the width of themselves away from each other, thus bringing a shearing strain on the joists.

Design for a Paneled Board Fence

From W. M. L., Orange, N. J.—Last spring while I was in Eastern Canada I noticed a paneled board fence which was somewhat different from the ordinary backyard fences we see here in New Jersey. I was interested to closely observe it and forward a sketch of it as it is rather an improvement in fence construction and may be of interest to some of the many readers of BUILDING AGE.



Design of a Paneled Board Fence

How Can Mirrors Be Refinished?

From J. T. B., Indiana.—Will you kindly advise me the ingredients and methods used to refinish mirrors? I once saw the receipt in one of my BUILDING AGES, of which I have been a reader for a number of years, but somehow have misplaced it.

If you will kindly advise me as above, I will appreciate the favor very much.

Answer.—In accordance with your request, I am describing two different methods of silvering mirrors and the formulas of the ingredients used in the process.

For complete formulas, and there are about ten different ones, I would recommend that you consult the "Scientific American Encyclopedia of Formulas," by Hopkins, which gives a complete analysis of them all. However, I believe the ones I give will answer your purpose. They are sub-divided under two headings as follows: "Silvering Glass" and "Cheap Looking Glasses," the first an expensive process and the latter a cheaper one. The construction of a hot table for large silvering mirrors is also described.

Silvering Glass—Ten grains pure silver nitrate to 1 oz. distilled water; add carefully, drop by drop, strong ammonia until the brown precipitate is redissolved—when adding the ammonia keep stirring with a glass rod.

In another bottle make a solution of 10 gr. pure crystallized Rochelle salt to 1 oz. distilled water, then, when you have all ready, pour on sufficient to cover the glass, using two-thirds of the silver solution and one-third of the Rochelle salt. The mirror can be prepared well by cleaning it with a little wet rouge, polishing it dry with a wash leather; then warm the glass before the fire or by letting it lie in the sun, to about 70-80 deg. Fahr. Pour on the solution as described above and let it stand in the warm sunshine one-half to one hour. When silvered, pour on it some clean soft or distilled water, and while still wet, wipe it gently all over with a little soft wadding, wet. This will take off all the roughness, so that it will take but little rubbing with the rough leather to polish it. When perfectly dry it is easily rubbed up to an exquite polish.

Cheap Looking Glasses—Place a sheet of glass previously washed clean with water, on a table, and run the whole surface with a rubber of cotton; wet with distilled water and afterwards with a solution of Rochelle salt in distilled water, one part of salt to 200 of water. Then take a solution previously prepared by adding silver nitrate to ammonia of commerce. The silver being gradually added until a brown precipitate commences to be produced; the solution is then filtered.

For each square yard of glass take as much of the above solution as contains 20 grm. (about 309 gr.) silver, and to this add as much of a solution of Rochelle salt as contains 14 grm. salt, and the strength of the latter solution should be so adjusted to that of the silver solution that the total weight of the mixture above mentioned may be 60 grm.

In a minute or two after the mixture is made it becomes turbid and it is then immediately to be poured over the surface of the glass, which has previously been placed on a perfectly horizontal table, but the plate is blocked up at one end to give it an inclination of about 1 in 40. The liquid is then poured on in such a manner as to distribute it over the whole surface without allowing it to escape at the edges.

When this is effected the plate is placed in a horizontal position at a temperature of about 68 deg. Fahr.

The silver will begin to appear in about 2 minutes, and in 20 to 30 minutes sufficient silver will be deposited. The mixture is then poured off the plate, and the silver it contains recovered.

The surface is then washed four or five times and the plate is set up to dry. When dry the plate is varnished by pouring over it a varnish composed of gum dammar 20 parts; asphalt or bitumen 5; gutta percha 5 and benzine 75. This varnish will set hard on the glass and the plate is then ready for use.

Silvering of Large Mirrors and Hot Table Construction.—The silvering of large mirrors or plate glass is done on a moderately hot table, the hotter the table the quicker the silver will be deposited. The body of the table may be described as a hollow zinc lined trough or tank covered on top with slabs of slate; 1 in. board is used for the body of the table, 1½ in. slate for the top. The slate is bedded on with red lead and varnish to make it steam tight. The slate top, when about to be used, has a blanket or felt cover, wet with water before the heat is turned on; at one end of the body is the steam pipe and valve and the steam is turned on very gradually when first heating up. At the other end of the body is an outlet and the steam valve must be regulated so that while sufficient steam enters for the purpose, very little is wasted by escaping from the outlet, which also discharges condensed water and prevents steam pressure lifting the slates.

The silvering process is to have the glass chemically clean and while still wet from the washing, place it on the hot table and at once pour over it a solution of gelatine or other mordant. Before this is dry, cover the surface with the nitrate of silver solution and let it remain 10 minutes. Then wipe with a leather squeegee and apply the silver solution again. Complete by wiping again with the squeegee.

Apply Varnish to the Back of the Mirror. To use the varnish pour it over the silvered surface and move the plate back and forth until it is distributed evenly over the face. W.G.

THE EDITOR'S PAGE

It Is Proposed to Federate the Building Industry

In order to afford the Government the intelligent support and entire co-operation of the building trades, the American Institute of Architects is initiating steps for federating the whole building industry of the United States. The object is to place the knowledge, skill, and equipment of the building industry unreservedly at the service of the nation.

A conference will be held in New York City on June 14 with a view to the possible formation of a national organization which will assume the burden of this undertaking. National and local organizations will be represented, whether technical, manufacturing, contracting or labor.

This step is an important one. If it results in the degree of success which is expected, the nation will undoubtedly reap a benefit from the project that perhaps even its most ardent advocates fail to realize.

Canal Opened in New York State to Relieve Freight Congestion

The Barge Canal of New York State was opened for freight traffic on May 21st under Federal direction, as an adjunct to the Railroad Administration. The need for this canal has been manifested many times during the past year, and it is to be regretted that delay upon delay in almost inexcusable numbers held back the completion of the project.

This canal should and could have been in shape today to carry its maximum of traffic. As matters stand now, only gradually can the 2500-ton barges be brought into use.

In the years gone by, when canal boats played a most important part in the development of the country, New York State owed much of its rapid development to the old barges that contributed to the Empire State prosperity. That the Government, instead of the State, completed the present work is to be regretted.

The new Barge Canal will have terminals in New York and Buffalo. Through and local freight shipments are being appealed for. The use which the shipping public makes of the canal will determine the degree of development which it will reach, and the present demand for the development of our waterways to relieve the railroads indicates a very high stage of development as more than probable.

Other states in the Union are likewise in great need of adjuncts to their transportation systems. Motor trucks for short hauls have supplemented the railroads in many districts and enterprising men are soliciting trade of this nature.

The canals, which were throttled by the railroads in the competition of the last century, must be developed and put to their maximum efficiency in view of just such another crisis as was brought on during the past year.

Should Government operation of the railroads be continued after the war, as many authorities seem to believe will be the case, the waterways will undoubtedly be developed to an extent which will retain their usefulness in the face of railroad competition with its faster service.

The Railroads Are to Be Built Up to Highest Efficiency

That the rolling stock of the railroads has been allowed to run down during the past few years is an unquestioned fact, and the $938,000,000 which the Government war operation will be allowed to spend on capital account this year measures almost the extent of their run-down condition.

This money is not going to be given to the roads, as some people seem to think, but is merely an expansion in railroad capital. The railroads must issue their own securities for these replacement charges, the Government merely undertaking to provide a market for securities by purchasing as many as may be necessary in order to dispose of the issue.

There are numerous plans looking toward the betterment of the freight situation next fall. A large number of cars are being built, but as the replacement has for the past few years been very much below normal, the new cars will just about keep up with what should have been provided in the usual course of events. The present expansion of freight requirements must then additionally be provided for in order to prevent congestion.

Freight shipments, including lumber, are coming through now better than for any time in the near past. Congestion in the West is reported as being practically relieved and the outlook till the next crop comes along is bright.

But when the fall crops begin to move the cars which are almost invariably empty at this time of year, will be requisitioned and great difficulty will again be experienced in getting shipments through. In fact, it is even prophesied by responsible authorities that the railroad congestion next winter will in some sections be even worse than during the past winter.

The Editor's Mail Bag

Here are some more letters which readers have sent me. They are interesting and full of meat, so I am passing them along.

Letters like this are always worth while, and I would appreciate receiving more. They are a real help. I shall always credit them by publishing the name and address of the sender, unless requested to use a nom de plume or initials only.

Will you help to keep the "Editor's Mail-Bag" full? This is your department, where you may criticize, make suggestions, and express your candid opinion of what you think of Building Age and what it ought to be.

The Postal Zoning Law

Last month I asked readers to help the magazines get a fair deal from the postal authorities. John Upton, of La Fargeville, N. Y., writes me that he has circulated two petitions which have been sent to his Congressman.

The following letter is a good one. Will more of you lend the weight of your opinion by writing to your Congressman?

Senator Saulisbury:

As the civilization of a nation is merely a barometer of its intelligence, and intelligence is diversified comprehensive and comprehending knowledge, it seems unwise to me, for us at the present day, when we are assuming the role of champions of civilization, to lower the order of our own, which we are certainly doing when we curtail the dissemination of knowledge through our second class mail matter.

Please use your influence to prevent the adoption of the zoning system or any other curtailment of the circulation of second class mail matter. We can offer to make any sacrifice the exigencies of the times demand except knowledge.

W. M. Newton, Contractor.
Dover, Delaware.

Proper Method of Stating Building Costs

Editor of Building Age:

In your March issue you request letters from your readers. I have been a subscriber for a number of years and take this opportunity of telling you how much I appreciate your paper and how much benefit I have derived from regularly reading it.

You have made changes. Most, if not all, have been for the good and I am sure your readers are pleased to see your efforts to make the paper up-to-date in every way.

One idea I would like to call to your attention. That is Building Costs. The cost of work as generally given is of no value to either the public or to the contractor. They mislead the one and tell the other nothing. General costs other than on a cubic foot basis should never be used and even these are very bad guides. I will never use them except to check a proposal in a general way after same has been carefully estimated. People ask me prices. I say I do not know. Then I take sketch plans, if they have them, and all available data, go

home and estimate cost as carefully as I can and tell them the next day. If this were always done there would be fewer losses in the building trades. "Snap estimates" are as bad as they can be.

When cost figures are given, have the work described. Tell how many hours it took to do the work and the rate per hour. The local rate can then be changed to suit local conditions so the reader can tell price in his own town. Costs reported on any other basis are of no value.

It seems to me the BUILDING AGE would be much improved if the question of costs was given more attention. After all it is the main question after quality is taken care of.

If I can be of any service to you along these lines let me know. I am spending a good deal of time in getting my cost reporting in proper shape and would be glad to pass along what I know.

With best wishes for your continued success, I am,

CLINTON M. CRUIKSHANK,
Building Construction.
New York City, N. Y.

Initial Cost of Fire-Resisting Construction Is Greater — Do You Believe It Worth While?

Editor of Building Age:

We have got to study how to make our buildings more fireproof. How many buildings have been lost by fire this winter because of defective flues or a settling of the building or chimney? Again, why do a lot of our rich men build mansions, spending $50,000 to $200,000, and then make no provision for water to protect them in case of fire? Another thing that always makes me smile is to see a rich man put up a wooden building, then plaster the outside with stucco, making no provision to protect the kitchen by extra fireproofing. Those people generally have servants that are careless and indifferent.

I call to mind the Taylor mansion that burned down about four years ago, really built by James R. Keene. It must have been lack of forethought that he did not make a connection with the water main in the street, say about 2000 or 3000 ft. away. The fire department did not have hose enough when the place got on fire and they had to depend on the windmill water tank, which amounted to as much as a squirt gun. The owner of the building collected a nice lot of insurance, which I as well as all owners of property have to eventually pay.

D. E. LENNOX.
Lawrence, Long Island.

Warm Air Furnace Installation in May Issue Criticised

Editor of Building Age:

Whether or not your publication desires the observations of a student of furnace heating can be best told by the reception that is given to some comments on the heating outfit that was installed in an attractive home of the bungalow type, illustrated on page 258 of your May number.

I looked these plans over and had not more than cast my eye on the basement plan before I noted that on the opposite side from the smoke connection to the furnace there were some lines running across the circle and then running back to the circle, which made me assume that this was the front of the furnace where there is the entrance to the ashpit and to the chute through which coal is added to the fire. I see immediately above this spot two pipes connected with the furnace top, and any man who knows anything about furnace heating will know that the pipes immediately to the right and the left of these pipes will take the air that rises up through the furnace and leave none to go into these two pipes.

The furnace is so located that one-half of its circumference, which is best adapted for air passing up to the pipes that might be connected on it, is away from the side where the pipes are connected and the pipes are connected at a point where the air does not rise naturally. That seems to me like poor furnace setting and may be blamed on whoever is responsible for it, the owner, the furnace man, or the architect, as the case may be.

A careful study of the plans shows that the risers to all the registers run up in the partitions, which means that in all probability their size is not more than 3½ x 10 in. or they may be 3½ x 12. Even when of this size, their effective area is less than 40 sq. in.

I feel sure that there are no 7-in. round pipes leading from the furnace to these risers and yet a 7-in. round pipe would bring all the air to them that they could carry away. In all probability here the same pernicious practice has been followed that has been the cause of the pipeless furnace having its day. The use of these partition flues orginally was only resorted to when a small room could be reached in no other way, but for the last 35 years the practice has been all going to the universal use of these partition risers, with the result that furnace heating has been looked upon as unsatisfactory and extravagant in the consumption of fuel, that it is impossible to heat the rooms on the windward side of a building on a windy day, and that the furnace is overheated, coal wasted and the furnace burned out in an extravagant endeavor to get sufficient heat in the building during cold, windy weather.

The people do not know what is the cause, but the architect and the builder should. They know enough about the furnace trade to know that the furnaceman would put in larger risers if the architect and the builder and the owner would encourage him to do it instead of obstructing his effort to that end. The size of a horizontal pipe leading from a furnace to a riser in the cellar may be properly proportioned to the work which it has to do. It may be a 12-in. pipe with an area of 113 in., an 11-in. pipe with an area of 95 in. or a 10-in. pipe with an area of 78 in. But as the studs are only set a given distance apart and the limit of size of the riser is 3½ x 12 with an effective area of about 40 sq. in., here is an attempt to get 113, 95 or 78 into 40. The best evidence that it is impossible is the large coal bill, the worn and warped furnaces and the uncomfortable home.

In the furnace field there is now a discussion going on where the professors from some of the engineering institutions are making their voice heard for better practice in the installation of furnaces. The pipeless furnace, which cannot do efficient heating if doors are closed through a desire for some privacy in the building, is being urged by those who sell and is being accepted because it certainly will make one room warm or even hot and the overflow will take the chill off of some others, which is as effective heating as some who have never had their homes heated from a central plant require, and they are satisfied with it. Without making any comment on the pipeless furnace except that its opportunity has been created by the faulty installation of the pipe system of furnace heating, it is fortunate that something has come along that will force a better consideration of pipe installations. No pipe carries air with so little friction and so little obstruction to the velocity as a round pipe and if the architect and builder will make provision in the buildings for round pipes, the coal bill will reduce, the heater will last longer and the house will be more comfortable.

Apparently the architect and the builder have given up all idea or consideration of the fact that the comfort and health of the family for six months of the year are dependent upon the efficiency of the heating system. They have gone on with their fresco, stucco, and interior decorations and embellishments without providing the all-important means of a comfortable temperature in the winter season.

I have no means of knowing to what extent this home was heated, which it seems has been occupied for a year, but I will guarantee that if the furnace were properly installed, the coal bill would be more in keeping with what the Fuel Administration seeks. With the furnace as now installed, the conservation of fuel is impossible. It is time for builders and architects to give more consideration to this phase of their work.

In the East the invaluable baseboard, side-wall register has not made its appearance, due to the fact that carpenters, builders and architects have not seen fit to change their methods of construction to make the register—which is a help to the furnace heating system and popular in the great West—as useful in the East as it is out there. The man who cumbers the ground with a home which may last for 30 or 50 or more years and so constructs it that it is extravagant in the use of fuel and almost impossible to warm it, has committed a crime for which unfortunately there is no law that as yet exacts a penalty from him. Some time since there was an effort made to secure a code for the installation of furnaces and those who were best informed on successful furnace heating favored the provision that no warm-air riser should have a greater width than twice its depth, but there was sufficient influence at work to secure the adoption of a code which permitted a width of three times the depth. That would perpetuate the present pernicious equipment. It is time for a change.

F. C., New York.

Building Activity Throughout the United States

A STEADY expansion in building construction is shown for this year, although the comparison of figures with corresponding months for last year show decreases larger than one cares to see. The showing for April is the most favorable so far, for out of 118 cities reporting, 27 show a gain as against 91 showing losses. The loss for the country is 39 per cent.

The East reports a loss of 52 per cent, 39 out of 49 cities reporting losses. Cities in the middle section of the country report a loss of 39 per cent, 31 showing a loss out of a total of 36. The Western section of the country reports a loss of 36, 10 cities showing a gain against 10 showing a loss. The Southern section shows a gain of 13 per cent, 12 out of 23 cities showing a gain. This activity is encouraging, especially considering the present conditions throughout the country.

The following extracts from reports

CITIES IN EASTERN STATES

	April, 1918				April, 1917			
	New Work		Repairs		New Work		Repairs	
	Permits	Value	Permits	Value	Permits	Value	Permits	Value
Albany, N. Y.	21	$149,150	148	$49,890	64	$264,485	234	$87,000
Allentown, Pa.	48	202,720	...	....	78	395,760	...	....
Altoona, Pa.	58	21,567	...	....	40	24,897	...	....
Atlantic City, N. J.	118	36,536	...	....	98	1,204,213	...	....
Auburn, N. Y.	24	45,155	...	....	32	19,344	...	....
Bayonne, N. J.	21	59,080	...	....	17	83,900	...	....
Binghamton, N. Y.	256	99,105	...	....	370	274,876	...	....
Boston, Mass.	69	459,540	361	389,856	160	2,440,563	278	221,826
Bridgeport, Conn.	158	310,002	...	....	166	545,075	...	....
Brockton, Mass.	22	47,425	25	30,810	19	40,597	15	12,785
Buffalo, N. Y.	431	589,000	...	....	550	939,000	...	....
East Orange, N. J.	38	165,621	...	....	61	210,226	...	....
Elizabeth, N. J.	64	229,048	...	....	46	189,960	...	....
Erie, Pa.	179	197,013	...	....	230	689,099	...	....
Harrisburg, Pa.	26	19,325	...	....	37	190,940	...	....
Hartford, Conn.	128	469,700	...	....	161	1,197,727	...	....
Hoboken, N. J.	7	165,494	9	8,825	3	960	18	12,274
Holyoke, Mass.	19	54,225	...	....	20	34,190	...	....
Lawrence, Mass.	17	172,500	10	19,500	10	23,000	17	34,350
Manchester, N. H.	81	47,845	...	....	121	547,530	...	....
Mount Vernon, N. Y.	21	76,400	11	6,725	29	86,364	23	12,724
Newark, N. J.	214	594,082	...	....	298	1,164,433	...	....
New Bedford, Mass.	44	163,300	...	....	49	117,500	...	....
New Britain, Conn.	21	33,015	34	13,630	38	109,740	28	5,050
New Haven, Conn.	130	269,469	...	....	167	543,154	...	....
New York:								
Manhattan	17	558,700	277	1,202,550	37	2,367,500	358	1,317,915
Bronx	259	302,771	...	....	357	1,648,606	...	....
Brooklyn	204	3,106,525	719	428,445	187	1,904,950	1099	547,607
Queens	357	743,510	...	....	836	2,185,666	...	....
Richmond	88	211,634	...	....	122	342,314	...	....
Niagara Falls, N. Y.	74	338,724	...	....	68	321,420	...	....
Passaic, N. J.	10	13,545	9	6,500	16	43,500	14	10,700
Paterson, N. J.	115	115,545	...	....	119	167,027	...	....
Philadelphia, Pa.	380	1,917,190	385	463,885	917	4,593,435	420	416,305
Pittsburgh, Pa.	191	577,488	152	193,993	233	750,656	181	197,487
Portland, Me.	31	59,350	17	25,585	39	35,780	23	38,225
Quincy, Mass.	82	156,208	...	....	75	109,520	...	....
Reading, Pa.	31	7,950	179	27,450	64	226,200	146	35,805
Rochester, N. Y.	135	216,065	89	49,333	239	413,275	127	151,102
Salem, Mass.	37	11,802	...	....	22	142,800	...	....
Schenectady, N. Y.	70	117,970	48	19,115	75	283,570	48	19,800
Scranton, Pa.	27	48,097	...	....	56	147,306	...	....
Springfield, Mass.	123	447,275	...	....	199	739,659	...	....
Syracuse, N. Y.	96	111,925	115	57,382	151	467,135	118	383,920
Trenton, N. J.	57	95,455	...	....	70	126,923	...	....
Utica, N. Y.	70	138,250	...	....	59	180,450	...	....
Wilkes-Barre, Pa.	97	41,673	...	....	107	195,773	...	....
Worcester, Mass.	184	232,833	...	....	298	1,009,004	...	....
	4971	$14,427,602	2826	$3,115,445	7302	$31,106,552	3412	$3,786,931

CITIES IN MIDDLE STATES

	April, 1918				April, 1917			
	New Work		Repairs		New Work		Repairs	
	Permits	Value	Permits	Value	Permits	Value	Permits	Value
Akron, Ohio	202	$452,741	81	$59,215	777	$2,361,543	108	$69,670
Canton, Ohio	162	337,280	...	....	167	554,145	...	....
Cedar Rapids, Iowa	33	79,000	...	....	56	179,000	...	....
Chicago, Ill.	396	2,767,900	...	....	672	9,524,450	...	....
Cincinnati, O.	132	188,590	299	151,875	214	74,014	352	199,705
Cleveland, Ohio	1146	1,793,365	...	....	1303	2,441,500	...	....
Columbus, Ohio	162	231,815	110	210,245	249	473,675	75	58,325
Davenport, Iowa	158	148,189	...	....	160	174,767	...	....
Dayton, Ohio	154	417,053	...	....	184	215,204	...	....
Des Moines, Iowa	94	228,945	...	....	57	263,880	...	....
Detroit, Mich.	554	888,020	329	297,520	1499	4,868,030	414	416,625
Dubuque, Iowa	12	123,674	...	....	30	40,805	...	....
Duluth, Minn.	215	146,276	...	....	159	104,372	...	....
E. St. Louis, Ill.	33	38,230	...	....	38	83,325	...	....
Grand Rapids, Mich.	141	137,602	...	....	203	184,987	...	....
Indianapolis, Ind.	479	445,422	...	....	641	775,802	...	....
Kansas City, Kan.	32	45,985	...	....	64	92,400	...	....
Kansas City, Mo.	197	454,455	...	....	352	1,291,400	...	....
Lincoln, Neb.	29	142,910	...	....	56	107,040	...	....
Milwaukee, Wis.	389	919,205	...	....	536	2,025,070	...	....
Minneapolis, Minn.	607	764,945	...	....	804	1,284,685	...	....
Omaha, Neb.	105	410,480	...	....	112	460,350	...	....
Peoria, Ill.	29	70,875	...	....	76	231,919	...	....
Richmond, Ind.	5	6,200	7	2,250	14	9,600	14	3,300
Saginaw, Mich.	33	33,070	...	....	35	38,067	...	....
St. Louis, Mo.	266	278,606	411	251,422	357	1,454,381	417	253,610
St. Paul, Minn.	229	6,776,218	...	....	233	877,244	...	....
Sioux City, Iowa	70	316,715	...	....	68	478,770	...	....
South Bend, Ind.	59	34,581	39	39,534	118	387,909	33	12,529
Springfield, Ill.	27	38,300	6	122,700	31	92,105	28	19,805
Superior, Wis.	88	90,005	...	....	105	106,052	...	....
Terre Haute, Ind.	36	29,927	44	11,755	29	28,570	43	12,493
Toledo, Ohio	239	184,739	...	....	506	1,176,969	...	....
Topeka, Kan.	19	5,343	...	....	29	11,665	...	....
Wichita, Kan.	112	441,730	...	....	122	447,510	...	....
Youngstown, Ohio	109	223,940	32	18,625	156	332,180	27	17,495
	6753	$19,692,331	1358	$1,165,141	10,212	$33,253,385	1511	$1,063,557

CITIES IN EXTREME WESTERN STATES

	April, 1918				April, 1917			
	New Work		Repairs		New Work		Repairs	
	Permits	Value	Permits	Value	Permits	Value	Permits	Value
Berkeley, Cal.	15	$51,200	42	$20,500	20	$61,500	45	$22,500
Boise, Idaho	2	6,000	40	9,802	5	10,475	37	6,560
Colorado Spgs., Col.	9	59,792	25	11,487	9	4,510	15	12,280
Denver, Col.	236	364,100	...	....	299	809,250	...	....
Fresno, Cal.	71	353,573	60	31,380	35	179,061	43	16,829
Long Beach, Cal.	172	241,499	...	....	74	68,495	...	....
Los Angeles, Cal.	328	575,707	281	183,607	466	2,327,424	723	373,176
Oakland, Cal.	164	544,922	76	47,969	138	359,206	64	29,793
Pasadena, Cal.	23	10,622	42	16,110	50	220,924	47	35,990
Portland, Ore.	218	205,890	234	137,300	140	329,680	145	61,180
Pueblo, Col.	40	58,407	...	....	39	19,240	...	....
Sacramento, Cal.	74	368,967	...	....	86	213,171	...	....
Salt Lake City, Utah	101	166,005	...	....	124	227,515	...	....
San Diego, Cal.	44	83,630	44	19,820	41	33,135	67	31,197
San Francisco, Cal.	71	535,788	284	158,512	133	730,713	383	176,133
San Jose, Cal.	31	164,752	...	....	41	32,705	...	....
Seattle, Wash.	1083	898,455	...	....	686	670,905	...	....
Spokane, Wash.	64	28,290	53	15,815	109	67,800	44	21,855
Stockton, Cal.	70	96,209	...	....	75	121,886	...	....
Tacoma, Wash.	142	204,437	88	33,933	50	97,882	49	24,671
	2964	$5,029,245	1271	$688,035	2620	$6,585,477	1662	$812,164

CITIES IN SOUTHERN STATES

	April, 1918				April, 1917			
	New Work		Repairs		New Work		Repairs	
	Permits	Value	Permits	Value	Permits	Value	Permits	Value
Atlanta, Ga.	99	485,432	97	34,466	76	345,038	157	96,425
Baltimore, Md.	130	1,108,243	540	108,200	226	532,269	972	185,400
Birmingham, Ala.	53	46,375	188	72,801	62	101,035	333	74,559
Charlotte, N. C.	17	205,595	17	12,387	20	60,475	...	....
Chattanooga, Tenn.	156	77,276	...	....	197	55,005	...	....
Corpus Christi, Tex.	4	430	...	....	5	10,900	...	....
Dallas, Tex.	33	174,354	49	51,580	45	129,000	36	61,730
El Paso, Texas	110	59,041	...	....	211	661,430	...	....
Ft. Worth, Tex.	51	333,055	...	....	53	246,065	...	....
Jacksonville, Fla.	35	92,120	...	....	24	15,765	...	....
Huntington, W. Va.	41	83,850	...	....	66	161,480	...	....
Louisville, Ky.	111	223,870	67	14,258	139	218,940	68	35,440
Memphis, Tenn.	112	271,635	...	....	174	201,105	...	....
Miami, Fla.	51	202,475	...	....	108	150,040	...	....
Montgomery, Ala.	105	30,849	...	....	113	14,590	...	....
New Orleans, La.	33	68,666	32	37,585	70	170,713	16	4,970
Norfolk, Va.	78	339,513	...	....	53	299,741	...	....
Oklahoma City, Okla.	112	305,700	...	....	110	313,034	...	....
Richmond, Va.	25	107,330	68	72,446	60	377,477	65	81,538
San Antonio, Tex.	257	261,095	...	....	124	190,527	...	....
Savannah, Ga.	28	77,905	...	....	41	136,300	...	....
Washington, D. C.	114	1,407,090	253	96,901	110	578,313	264	135,992
Wilmington, Del.	44	94,003	65	85,876	88	208,734	53	57,544
	1854	$6,124,227	1376	$586,499	2175	$5,177,976	1964	$733,598

from various cities throughout the country are typical of conditions prevailing; from Louisville, Ky., comes the information that "several large factories, warehouses, banks and churches were erected during the last few months. Very few dwelling houses were built because of unfavorable conditions." Tacoma reports "a building boom on account of shipbuilding and the American Lake cantonment. Most of the building is adjacent to the plants which are outside the city limit." In Oakland, Cal., there is a "demand for dwellings to house workers in industrial plants;" Colorado Springs, Col., states that "conditions are improved with quite a bit of general repair work being done." South Bend, Ind., states that "few new dwellings are being erected. There is an increased number of permits for altering single dwellings into double dwellings." Wilmington, Del., states that "only necessary buildings are being erected." Richmond, Ind., reports "business slow for April. Bond sales and taxes for state and county cause business slowing up. An improvement is soon looked for." These quotations from inspectors of building departments give somewhat of an idea of the general conditions prevailing in the building trades during the past month.

Where cities report large increases, the cause is mainly due to some exceptionally large building operation, rather than a number of small ones.

Making Your Printed Matter Bring Back Business

A Few Business Building Suggestions Which Will Show You How to Make Your Stationery Do Double Duty

By R. F. Duysters

IDEAS are valuable in proportion to their adaptability to the reader's business. It is not expected nor desired that the following ideas be used just as they are written down here. Personality is a very important factor in any business and especially is this true of the retail trade where you constantly come in close personal contact with your customers. It is hoped therefore that the reader of these lines will see the wisdom of working out these ideas and applying them to his own business, at the same time not neglecting to weave in his own personality. A writer in a recent number of *System* claims his business of over $600,000 in a town of 1000 was built entirely on borrowed ideas. He did not originate a single one—he got them all from other lines and merely adapted them to his needs. If you have the ability to adapt ideas and visualize their usefulness in your business it is as profitable as though you had taken the same amount of time to think up original stunts and schemes.

The added value of letterheads, billheads, envelopes, receipts, etc., as business builders is often overlooked and thus the few suggestions set down here may be found useful. For instance a man named Green cashed in on his name by making the color green predominate throughout his business. His letterheads are printed in green as are his bills, receipts, envelopes, business cards, etc. All billboard space used by Green is plentifully splashed with green as is all his printed matter, circulars, etc. The delivery wagons are not overlooked and even souvenirs which he gives out usually have a green hue. So persistently has this progressive dealer stuck to this form that those within a radius of 20 miles almost automatically think of building materials when they see the color green.

"TO MAKE YOU HAPPY!"

We are glad to pass this money on, and you are glad to receive it, so this old world sees two happy hearts today.

Your endorsement is our receipt.

SMITH & ROBINSON,
Newark, N. J.

A Unique Card Enclosed When Paying Bills Builds Good Will

Regardless of whether one's name happens to correspond with some color this scheme may be worked out successfully by anyone choosing some one particular color or trade or identification mark and sticking to it. To make it most effective, however, the smallest detail should not be overlooked. Thus will every truck that leaves your establishment and every single piece of literature sent out connect with your regular publicity work and bring your name to the front. Even envelopes should be so identified that the letter carrier and every one else who sees them will immediately recognize them. This individuality in business has paid others and can be made to pay you.

Build Good Will When Paying Your Bill

The head of one enterprising concern we know of takes the opportunity to build good will with those he deals with by means of a unique card which he encloses with his check when paying bills.

This little human card brings a different atmosphere with it from the ordinary printed stuff that is received every day, and somehow the writer feels that the people who sent this out and who thought it up are regular human beings who live and love and believe in the Golden Rule. However, it is also good business and helps to make your name stick in the memory of those with whom you deal. It's a little, inexpensive thing, but it's worth while.

The ordinary 8½ x 11 letterhead is seldom taken completely up with the typewritten letter and often there is a wide margin left on both sides. Many firms take advantage of this space and

use it as a further means of advertising their business. By leaving a margin of about two inches to the left you have plenty of space in which to run a list of satisfied customers who have done business with you or perhaps some original testimonials if you have them. The testimonial idea is always effective if you print the name and underneath some of the nice things your customer has said about the quality of your material or the efficiency of your delivery service, etc. Another equally effective way of utilizing this space is to have some small photos made of your yard and office and perhaps your delivery trucks and run these down the side one underneath the other with a few words under each about your ability to make prompt deliveries from your large stock, etc. Some dealers like to encourage the telephone trade and feature their telephones very prominently. For instance a small picture of a telephone is shown in the upper left hand corner with the number beneath and a wire is seen extending across the sheet down to the lower right-hand corner where there is a drawing of a man with phone in hand and a caption reading: There is a live wire in our office always at your service. Another way is simply to print a good-sized cut of a telephone (and, by the way, ask your telephone company for book showing free cuts which many supply) and then a few lines such as: "We are always glad to have our customers call and inspect our stock but if they are busy the phone is for their convenience and 'phone' orders will be carefully taken care of and promptly delivered."

Featuring Side Lines

If you, like many dealers, have been adding to your stock owing to the demand for materials other than lumber it is a good plan to run a list of these materials on your letterhead. As you get in additional material you can print it in or use a rubber stamp but don't overlook this opportunity to keep your customers informed of everything you are handling. It might be advisable to run a heading over this list somewhat as follows:

Look This List Over
And Keep it Handy
For Ready Reference

From
The Louis Lander Lumber Co.,
90 West St., Boston, Mass.

To

If after checking this order it is not found correct in every detail please write or phone at once. Mistakes will be immediately rectified if we are advised promptly.

For

Thank you for this order. It is hoped that it will prove satisfactory in every respect. If it shouldn't, please tell us—don't nurse a grouch.
The Sidney Supply Co., Akron, Ohio.

From The Acme Supply Company,
28 Watt St., Washington, D. C.

For

Our desire is to serve you promptly and efficiently with first class materials. Whether your order be small or large it receives our most careful attention.

Suggestions for Making Labels Build Good Will

JOHN JONES & CO.
Lumber and Supplies
MADISON, WISCONSIN

Sold to.................................... June..........1918.

....

....

7-1-18	Our books show that you have not favored us with any orders during the past month and naturally we are wondering why. Your patronage has always been very much appreciated and we have tried to merit your custom. If for any reason you have not been satisfied with any material you may have purchased from us or if you have any complaint to make of the service, won't you write us frankly and tell us about it? If you're in need of anything in our line right now, won't you give us a ring and let us quote you prices? Sincerely yours,	$0	00			
				$	0	00

An Unusual Kink In Asking the Why of Lost Patronage

Of course calendars and blotters can be and are used for this purpose but sight should not be lost of the added publicity obtained in this way. There are really so many ways of using a letterhead in this manner that it is difficult to say which is most effective. Wm. A. Douglas, the well known shoe manufacturer and former Governor of Massachusetts, has always been a firm believer in introducing his own personality into his business as is shown not only by his advertisements which take up various episodes in his life but by the fact that he has a picture of himself used on every letterhead, label, shoe box, etc., which leaves his factory. His business has grown to be one of the largest of its kind in the country, but never has Mr. Douglas deemed it wise to remove his face from any of the printed forms. There is food for thought in this action of a successful business man. Sometimes when competition is keen or perhaps the mail order houses are eating into your business it may pay to feature your own personality. Perhaps you are more successful than anyone else in your firm in making sales Perhaps it's due to your personality. Then why not inject that personality into your letters? Not only in what you write, but how about a picture of yourself in the yard or office, perhaps actively engaged in filling an order? Don't you think it would help the man to whom you write to judge of the man who is writing to him? Don't you think your printed words would be more effective if the reader could visualize the man who wrote them? As Putting Personality Into Your Letters may be the subject of another article we will not go further into this now, but wish to leave the suggestion of printing your own picture on your letterheads.

Utilizing the Space on Labels

If you use labels, tags or stickers don't overlook their possibilities as advertising mediums. There is usually ample space on them to carry a little message about your firm or service or materials and as it costs practically nothing why not use it? A few suggestions for use in this space are given elsewhere on this page.

You can very likely think up some original and appropriate sayings which will apply to your our business.

If business houses could hold 100 per cent of their customers all the time, the expense attached to getting new business would be reduced to a minimum, but unfortunately they cannot do this. Customers stop ordering for no apparent reason and many concerns forget about former buyers in their feverish search after new customers. Others, however, have been quick to see the fallacy of this method and instead take great pains to bring old customers back and keep their trade. An unusual way of doing this was brought to the writer's attention recently. A letter asking the reason for the discontinuance of patronage was sent out, but instead of being printed on an ordinary letterhead, a regular billhead was used as shown above.

This method of asking "why?" is very much more likely to receive attention and produce results than the ordinary letterhead.

It is hoped that the reader will find, in some of the above ideas, some which he can adapt to his business, for, after all, ideas count and the biggest businesses in the world have been built on an idea.

Some Annoying Practices in the Retail Trade

By C. E. Davidson

THE purpose of the preceding articles published in BUILDING AGE upon the topic of Annoying Practices in the Retail Trade, with special references to the relations existing between retailer and the manufacturer, was to produce a better understanding and a kindlier feeling between the two great agencies. It has been gratifying to note a response in that direction.

Wealth, prominence and influence bring to some men a spirit of dominance, either consciously or otherwise, that sets up irritations and eruptions in business that are entirely unnecessary and which result in evil conclusions. No man is to be more admired than the one who has wealth and prominence, who is broad and great enough intellectually and at heart to consider his less fortunate brethren. We are all of one blood, in fact actually related—the time-worn saying, "the brotherhood of man," being an actual reality, as the laws of heredity will attest.

In the recent issue of The White Pine Series, Architectural Monographs, No. 2, Chas. A. Weyerhaeuser, president of the Northland Pine Company and the Potlatch Lumber Company, and who is otherwise interested largely as a retail dealer, we find much of interest in an article he has written on "Getting Closer Together."

What C. A. Weyerhaeuser Thinks

Mr. Weyerhaeuser states that he was wholly a manufacturer up to within three or four years ago and that he did not formerly have the perspective of the relation of manufacturer and dealer which he now has. He says that during his previous time as a manufacturer solely his time was occupied in the buying of timber and the logging and manufacturing of it. He says he thought he "had troubles enough of my own and lots of them in the logging and manufacturing ends of the business." When he became interested about four years ago in the retail distribution of lumber to the consumer it was then that "I began to appreciate how really great a part the retailer plays in the successful marketing of lumber, and how many possibilities we manufacturers have been overlooking all these years." Here is a frank statement which all retailers will heartily appreciate. He states further that he also "was astonished to find how little the average retailer knows of his source of lumber supply and the vast labor and expense required of the manufacturer." Further on he says that "the more I investigated I found that the producing and the distributing ends of the business were separated by a simple lack of appreciation of the many ways in which they might help each other sell the greatest amount of lumber at the greatest profit."

Sales Co-operation Essential Between Dealer and Manufacturer

He suggests sales co-operation and a more intimate knowledge of what the other fellow is contending with. This is certainly demonstrating a spirit which will meet with the full co-operation of all dealers. In the past there has been a certain percentage of manufacturers, or at least their sales managers, who proceeded upon the theory that all retailers were a lot of necessary evils which they must endure, but as a class they were a set of scamps, and treatment in line was often applied. They simply gave to salesman a stock sheet, paid him for selling their product and let it go at that, hit or miss. They made grading rules for the one single purpose of settling lawsuits by. No mill to-day ships lumber which would only pass the grading rules. Retailers understand the matter thoroughly and therefore would settle nothing by the grading rules. We dare say that the graders employed by the associations have precious little to do, because they know that most any kind of a board will pass the rules—that is a board sold as a No. 1 common will pass the rules if it only passes the grade No. 2 which is actually shipped ninety-nine times out of a hundred, and which the dealer has a right to expect through custom.

Will Grading Rules Stand Court Test

We believe, too, that the average grading rules would not stand a test in court. The manufacturer who would introduce them as the basis upon which the sale was made would or could be met by the fact that nearly all mills by custom actually ship a distinct grade from that called by the rules, and custom would no doubt prevail.

But we pass that, for it is given only to show the policy which was in vogue in the not very distant past, but which we are happy to say is passing away. Manufacturers are meeting retailers at conventions and find they really do not have horns. They only want a fair deal, and would welcome with outstretched arms the co-operation which Mr. Weyerhaeuser favors. The retail trade is to be congratulated that it has on their side such a distinguished lumberman.

Mr. Weyerhaeuser calls attention to the troubles of the manufacturer in selling the entire product of the log and to the problems of how to cut the log, etc. Later on, his experience as a retailer showed him that by understanding the needs and problems of the retailer he might cut his log so that he might sell the entire product of the log. The old question of short lengths has been up many times. It was a very unpopular subject with retailers, and was the indirect result of more retailers refusing to handle western woods than any one other thing. It was not that retailers could not handle short lengths in certain items, but the manufacturers not thoroughly understanding the demands undertook to say a certain proportion of short lengths should be taken in other items which it was not possible to handle. But nevertheless short lengths can be advantageously handled if a little cooperation is effected. Mr. Weyerhaeuser says the "manufacturer should assist the retailer in finding uses and creating a demand at the retailer's yard for all the products of the log." It does not matter with the retailer what he sells and he will naturally buy what he can sell. A retailer would say that he can sell short lengths if the price is some lower than the standard lengths. But it is out of the question to sell a man a nine foot stick when he wants one 16 feet long. Carpenters, and in fact all workmen in all trades, for that matter, "want a thing when they want it," and they usually want just that.

Mr. Weyerhaeuser as a retailer is helping his mills as a manufacturer sell the whole cut of the log. He says it is just the "lack of co-operative effort and the ceaseless demands upon manufacturers for certain lengths which creates the idea lumber is scarce. Salesmen have left the impression that a stock a certain dealer wanted could not be had and thus left the impression lumber is scarce." The dealer thinking lumber was growing scarcer has bought substitutes.

Why Dealers Are Buying Substitutes

One dealer he mentioned, who could not buy a full car of white pine lath at a mill, bought a car of metal lath as a substitute. He says manufacturers should make it easy for the dealers to buy lumber and that dealers on the other hand can help the industry by making it easy for their customers to buy lumber.

Salesmen often have on their stock sheets certain items the mills want to move, but never suggest their sale to their customers but simply push standard lengths and grades. Retailers are often compelled to ask to see the bargain list or inquire what they have they want to move.

Nothing stabilizes the industry more than for prices to remain normal. When an advance is posted dealers hesitate to

buy and begin to watch for disturbances. When prices start to drop dealers simply quit buying and proceed on the hand-to-mouth policy until they are certain normal conditions are again established. Manufacturers ought to be able to figure out their costs of production, add their just profits and let prices remain there. The customer who comes to the dealer and finds that the lumber he wants has risen in price may leave without buying and this fact the dealer knows.

Such an incident creates an impression, too, in the mind of the purchaser that the dealer is trying to get more than he should, and then commences a campaign of running around from dealer to dealer with consequent cutting and slashing of prices. Stable prices ought to be maintained wherever possible.

Overcharging of the dealer also is the reverse of co-operation. Recently a dealer wrote to a Chicago firm for some fir windmill stock, local shipment. The dealer knew that the stock delivered f.o.b. Chicago was worth exactly $42 per M. He expected of course to pay at the rate of $60 or $65 per M. When the stock came, with it came an invoice for just $90 per M, or more than 100 per cent profit. The dealer had of course to pay freight and war taxes and had at the end fir stock which cost him ten cents per foot. Suppose he asked a good customer 13 or 14 cents per foot, or, to put it another way, as some dealers do, $13 or $14 per hundred for the stock, what would be the impression the customer would have a right to form? He would know he was being robbed. The wise dealer had better trade dollars on such a shipment than to create such an impression.

Again the mills should consider that dealers cannot insist upon cash settlements for their lumber upon delivery. The credit system is a part of our financial system. It is annoying, but it is a real condition which must be met and endured. During busy seasons a dealer has two lumber yards—one under the sheds, one out among his customers and sometimes part of another one either ordered or on the road to his yards. If the terms of the mills are harsh the dealer is most miserable "when business is good" and finds relief only when business stops and he can gather himself together and collect up to keep the sheriff from his door. The mills could do no differently if they retailed the lumber themselves. Therefore a terms of sale should take into consideration, while enforcing collections promptly, delays in railroad transportation and in short "have a heart." We feel that eventually the now proposed terms of sales by trade acceptances, which will allow sixty days from date car is received and counted, will be the solution of one of the most annoying of all retail yards trouble and incidentally as well that also of the manufacturers.

We are delighted at the splendid article by Mr. Weyerhaeuser. It is prophetic of better days for the retail dealer.

I still solicit from the retail dealers instances of annoying practices which have occurred in their businesses. A number who have written me have not given me, in some instances, a full statement. Would be pleased to have any retailer who may be interested in these articles send me a statement of any instance in which he thinks he was treated unfairly. The information will be handled fairly, yet advantageously, we hope, to the retailer. I sincerely believe that when the executives of mills once learn of the existence of annoying practices that they will take steps to remove them and this campaign of education will be mutually beneficial to both retailer and manufacturer. Address me at Greenville, Ill.

Increase Your Profit by Cutting Costs

Ideas in Efficiency of Yard and Office Which Will Give You a Better and More Economical Organization

By G. Ernst

A MAN who is running a business can do one or both of two things in order to make it more profitable—either increase his business so that he has a quicker turnover and does a larger volume of business during the year, or lower his costs by reducing running expenses and waste.

With conditions as they are to-day, lack of private demand and uncertainties of shipment, it is absolutely necessary for a dealer to cut his expenses to the minimum. All unprofitable items should be cut out and side lines which will help business added.

In England many of the food shops are driven to extremes that would be laughable, if the situation were not so serious, in order to do business. The spectacle of a meat shop selling cheese because it can get no meat to sell, and a dairy shop selling vegetables but no milk, is a foretaste of the manner in which an aggressive man can hold his business together in spite of conditions which are enough to daunt the most courageous.

Make Sure That Your Lines Are Turning Over Profitably

I have visited many a lumber yard where much of the material on hand was patriotically contributing to the size of taxes which the dealer had to pay on his land, but which were not furnishing the dealer with any profit at all.

The average lumber yard has certainly some lines of molding or odds and ends of side lines scattered around which nobody knows anything about, and which would be far more useful as the basis for a good bonfire on the Fourth of July. At least the dealer would then be free of the expense entailed by filling up his yard with unproductive stuff which he only too often does not know is there and which stands very little chance of ever being moved, except by accident.

See Where You Can Economize

If business is not to be had, then the wise man will look at his business and see just where he can economize and allow himself a greater total profit on every sale that he makes. This will in effect be the same thing as having larger sales. The first thing to do is to find out what lines are affording a profit, and what unprofitable or shaky lines can be built up, eliminated, or be replaced with something that will help build up trade.

A certain amount of business must be done in each line in order to make it profitable. Find out just what this volume of business is, and see how near you are to reaching it.

Examine all the expenses carefully and see just what can be cut down economically. Expenses can be cut uneconomically by lack of proper consideration of the results that are to be obtained. The mere saving of a few dollars here and there is nothing, it is the saving of the dollars by instituting methods which secure the same results as previously obtained. This is real economy, because it gives at least as good results if not better at a lowest cost than is at present being incurred.

Eliminate Overhead Waste

There is a certain amount of overhead waste in almost every business. I know of one grocery store which reduced its force from five men to four men by providing each one of the clerks with a small adding machine. This adding machine, which cost about $15, enabled the clerks to save considerable time in adding up the items that customers ordered and reduced the possibility of mistakes to a minimum. The storekeeper made an initial outlay of possibly $60, which was made up in four weeks by the saving of the wages of one clerk, and then the adding machines went on making money for him merrily.

You can look around in your own business and see where the addition of some machine, such as an adding machine, a bookkeeping machine, a more economical system of records, would reduce your help and enable you to get better results at a lower cost than you are now getting. Perhaps you may have to make

a small initial outlay, but this is always advisable and economical where it will result in cost saving at a future date.

You can look around and see just what employees you have that are working at half capacity. It may be very possible for you to hire a man at $25 a week who will do the work that two $15 clerks are now doing or even what three men are now doing, providing he is given adequate implements and proper working conditions.

Find out just how few men you can efficiently make use of in handling your office and your yard. See that these men are so employed that their time is not wasted by doing things that a cheaper man could do. It is absolutely the worst kind of economy to employ a $30 man to do $30 work one-half the time and $10 work the rest of the time. It lowers his efficiency and lowers the efficiency of the entire establishment. If he does such work for any length of time, the $30 man is quite liable to gradually drop down so that he is not earning his salary for the company which he is working for even in the $30 work.

Another thing that you can do in order to make more money is to reduce the number of bad debts that you have. One of the greatest and best means of doing this is by prompt billing of your customers.

I recently bought some fertilizer from a nearby farmer, who acted as an agent for the stuff. When I bought it, I wanted to know how much it was, but he didn't just know. I have asked him about six times since then what I owed him, but he kindly said: "Oh, that's all right; I got that home in my book and I'll let you know about it pretty soon." As a result, I don't feel like paying him his money because I bought the stuff so long ago that I have gotten the benefit of it, and to give money now seems like paying for something which I never had. Probably about two or three months from now he'll make up his book and come around and ask for his money. It is quite possible that it may not be convenient for me to give it to him then and will have to put him off and maybe forget about it entirely.

A lot of dealers do business on the same principle. They grant unlimited credit and take no means of getting the money from a man before he gets the benefit of the material and forgets his obligation. If you were to go to a clothing store and buy a suit of clothes, wear it for a year and then go around and buy another suit of clothes, paying for the one that you bought last year as well as the new one, you would certainly feel as if you were giving the tailor money that he had no right to.

Don't Waste Time Looking for Things —Systematize!

Systematize the yard as well as the office so that you can lay your hands on everything at a moment's notice. What is the use of paying wages to a man to go around and look for stuff when a little system would enable him to put his hand on it at a moment's notice? That is absolute waste which must be cut down to the minimum if a lumber yard is to be run efficiently.

Courtesy of Motor World.

Strip for Action and Put Your Business Over the Top!

But there must be an adequate cost system, which will show just how much each item cost, its proportion of overhead, which will probably vary under present conditions from month to month. It is always wise to have a perpetual inventory so that you may know just what stuff you have on hand. When you order a couple of carloads of hemlock boards, it is a good idea to put your quantity down in a ledger. Then as you sell any of this material, put down alongside of the quantity bought the amount sold. Subtract this amount sold from the balance which you have on hand, and this will give you what you have in stock. A system such as this would show a man just how much stock he has got on hand in any item and will enable him to see if it is moving fast enough. When a man always knows just what balance he has on hand, there is less likelihood of his finding himself short.

Study the matter of displaying your stock to its best advantage, even if it is only splinters and knot holes. If you get a contractor or a house owner coming into your yard, and show him around, pointing out the fine stock that you have and the quick way in which you can fill orders, he's going to go away with an idea that you have a pretty efficient system there and that you're a pretty good man to do business with if he wants the right kind of treatment.

When you are selling stuff to a man who wants to put up a house he doesn't care anything about how much material is needed or what its name is or the grading of it. What he wants to know is that he's going to get pretty good stuff and he wants to know what it looks like. If you put in some sort of a display room, go out among the house owners and bring them in to show them the kind of shingles that you have, for instance, or bathroom tile, or the various kinds of brick that he can use in connection with that new garage that he's going to put up—why he is quite likely to think a whole lot more of your stuff than if somebody goes around and tries to sell him some fancy brick which has a first class appearance and over which the salesman can enthuse, but which affords the house owner no idea how it will look laid up in the wall.

Several successful dealers that I have visited recently had pretty good showrooms of one kind or another. Every dealer has a little bit of a showroom, such as perhaps a side of a wall laid up with wall board that he sells or a dwarf brick wall, or some such little thing as that. Very few, however, make any sort of an effort for a real showroom that will produce business for them. Lay out your stock so that you can show it to people and give them some idea of what they are going to buy and how it is actually going to look in place. If you can do this, especially with a man who doesn't know an awful lot about the business, you will get his trade, whereas your competitor who makes use of no such methods will not draw the trade which you are getting.

Try and organize your force so that they have some idea of real salesmanship. Send them out to talk to people who might be good prospects for building

materials. They may be able to arrange with some contractor to do work for you on a commission basis. You can then go out and see if you can stir up somebody to build a private garage, to put on a new porch, to equip a house with a nice new front door which will change the whole appearance of the place and improve the doorway a hundred per cent; put new shingles over an old shingle roof, quoting them what the total cost of the job will be and showing them pictures of similar jobs which have been done.

Even under present conditions there is quite a bit of profit that can be gotten along the lines mentioned above.

Lots of people lay down as soon as they run up against some sort of a difficulty or as soon as business conditions do not seem to be all that they might be. It is only human nature to be discouraged and to think that the other fellow has a lot easier time than you have, but this idea never got anybody anywhere.

Then, so far as I can see, there is not going to be much increase in business until the end of the war from present private interests, outside of demand for farm building and repair or remodeling work. The only way in which the dealer can make both ends meet is to make himself and his business more efficient. He can do this by organizing it and cutting down the waste in his office and yard to the absolute minimum. He should try for absolute efficiency throughout his entire organization.

How To Get More Business

Then in order to drive up some sort of business that will help him keep the work going it will be necessary for him to go out among the people in the town and nearby sections of the county. He can talk to them about improvements that can be made at small cost and which will give him a certain amount of business that will make both ends meet. A few by-products added to the yard will help, even though they may not be strictly allied with the lumber game.

But don't lay down on the job, keep going and see to it that your entire organization is so speeded up that it will help you keep going and bring in the business. Remember that the man who manages to hold over now and secure the business of his competitors is going to be in a pretty strong position to make plenty of money when the war is over. He will have his business so organized that he can walk rings around any one who comes in and tries to take his trade away. I know one salesman for a lumber manufacturer who handled a certain southern territory. A competitor sent in six salesmen, who spent 90 days in going from one retail lumber dealer to another. During that time they sold three carloads of lumber. Needless to say, at the expiration of the 90 days the salesmen were quietly withdrawn, and since that time no one has ventured to invade the territory. Build up that kind of a trade and treat the customers with so much courtesy and honesty that somebody else will find it almost impossible to take them away from you, for square dealing is one of the secrets of success in the lumber business as well as in any other.

Then there are plenty of opportunities for increasing the efficiency of the delivery system. Maybe the buying of a truck will enable you to eliminate two or three horse teams, merely paying one man to drive a motor truck rather than two men to drive delivery wagons, together with the elimination of the cost of feed, etc., for the horses. Then there are systems which will enable you to load your lumber on and off the trucks much easier than you are at present doing. All this will help speed up your delivery system and enable your driver to go on more trips than he is at present doing, thus cutting down the average cost of each delivery.

New Equipment That Will Interest Builders

TWO new items shown in Figs. 1 and 2 have recently been added to the line of wrought steel corner irons and mending plates of the Stanley works, New Britain, Conn. Fig. 1 shows No. 999½ ornamental corner iron, which is made in sizes ranging from ⅜ x 2½ in. to 1½ x 8 in. and furnished in bright steel and brass plated. It is packed in cartons with screws to match. Fig. 2 shows No. 998½ ornamental mending plate, which can be obtained in sizes ranging from 2 to 10 in. in length, being furnished in bright steel and brass plated. It is packed in a carton with screws to match.

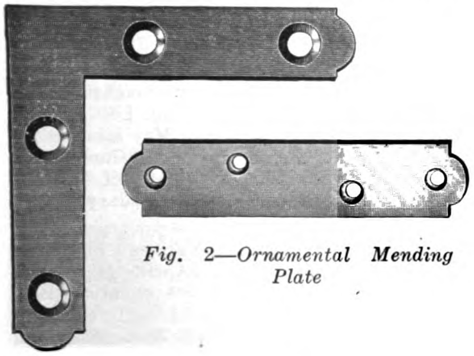


Fig. 2—Ornamental Mending Plate

Fig. 1—Ornamental Corner Iron


Fig. 3—A Concrete Cart

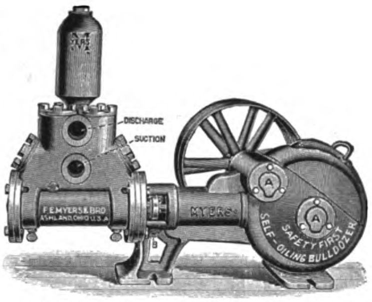


Fig. 4—Myers Self-Oiling Bulldozer Pump

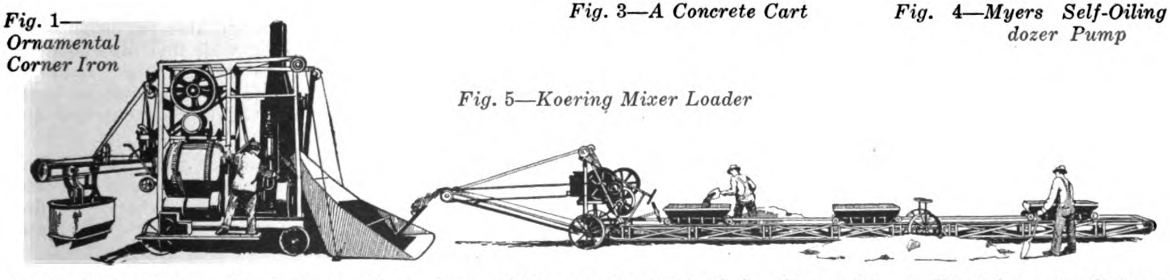


Fig. 5—Koering Mixer Loader

A labor-saving concrete cart known as the Boss Hyatt Bearing Concrete Cart, shown in Fig 3, has recently been brought out by the American Cement Machine Co., Keokuk, Iowa. It is built of steel

throughout, the body being No. 14 gauge steel with No. 10 gauge steel reinforcement. It is stated to be amply strong enough to "stand up" for long service and, at the same time, is said to be as light in weight as a serviceable cart can be made. The weight of the complete cart is 240 pounds. The light-running feature is due to the balance, high wheels and Hyatt roller bearings. These bearings and the 36 in. high wheels are claimed to reduce the power necessary to move the cart nearly 25 per cent. This cart has a capacity of 6½ ft. for wet material. The axles are 1½ inch cold rolled steel and wheels have 2½ inch tires.

A new type of Bulldozer pump manufactured by F. E. Myers & Bro., Ashland, Ohio, is shown in Fig. 4. It is called the Myers Self-Oiling Bulldozer. The gears of the pump are completely covered and thoroughly lubricated, needing no attention in this respect aside from filling the reservoir with oil occasionally. The pump is constructed with waterways and valves larger than usual, which together with the self-oiling feature permits the pump to be run faster than other types of pump, thus giving greater capacity for the same size cylinders and stroke. The pump is made in three sizes, with capacities from 1000 to 3000 gallons per hour and has a large range of work in connection with gasoline engines, electric motors and other power. The pump shown in the illustration is intended for general service.

A mixer loader, manufactured by the Koehring Machine Co., Milwaukee, Wis., is shown in Fig. 5. It is a combination of measuring bins and the belt conveyer principle applied to a light portable machine, which is supplied with its own power and traction. It moves from job to job under its own power and in paving work precedes the mixer. The full, over-all length of the machine is about 60 ft. It receives material from any point within this distance of the mixer. The measuring bins are mounted on the frame and provided with wheels which roll on tracks on the top and along the length of the frame. Two or three bins are provided according to the capacity of the mixer. Each bin is adjustable. The sides are extendable so as to hold the proper proportion of aggregate for any size batch. By striking off the bins an accurate measurement of materials is obtained. The frame is adjustable up and down, providing plenty of clearance for traveling from job to job. When bins are filled with aggregate, properly measured, a lever control opens the bottom of each bin, permitting aggregate to fall on the conveyor belt, moving at the speed of 500 ft. per minute, which carries materials to the mixer and into the loading skip which is then operated in the usual way. When the last batch has been two-thirds discharged from the drum the loading skip is started, as is the usual practice, so that new aggregate enters the drum at the instant the last preceding batch is discharged. It can be used with any mixer without changes in the mixer except the placing of a baffle plate in open end loading skips, which is a simple job.

New Catalogs of Interest to the Trade

Any of these catalogs will be furnished by the manufacturers. Or, if you prefer, we will see that you receive any that you desire. Just check the catalogs you want, tear out the page, and mail it to Building Age, 243 West 39th Street, New York.

A Technical Hand-Book on Expanded Metal Lath.—Bulletin No. 16, prepared by the Berger Manufacturing Co., Canton, Ohio. A valuable booklet showing metal lath used in building construction for purposes such as partitions, over wood lath to reinforce corners, stair inclosures, hollow tile wall reinforcement, corn crib, fireplace hearth, etc. Detail drawings show construction at door jamb, erecting false beams, ornamental cornices, round column protection, standard stucco construction on metal lath, stucco overcoating on lap siding with metal lath, etc. The latter part of the booklet is devoted to description of how to apply expanded metal lath, together with tools and materials needed, standard specifications for stuccoing, and other valuable information.

The Home You Longed For.—Arkansas Soft Pine Bureau, Little Rock, Ark. An interesting set of photographs and floor plans of houses built of Arkansas Soft Pine, the designs being by Robert Seyfarth, architect. A brief bill of material, together with the cost, affords valuable data. A brief description points out the salient features of each house. The designs are in looseleaf form.

The Concrete Builder. — Bi-monthly magazine, published by the Portland Cement Association. Vol. 1, Nos. 1 and 2, are devoted to interesting information concerning the use of concrete for the farm and home. There are contained, working drawings for the design of a concrete storage cellar, poultry house, etc. Photographs and articles concerning concrete construction are contained.

Successful Trial Trip of Reinforced Concrete Steamship.—Portland Cement Association, 111 West Washington Street, Chicago, Ill. Describes the trial trip of this ship, together with some description of its construction.

Art Metal Ceilings That Appeal.—Milwaukee Corrugating Company, Milwaukee, Wis. Folder showing pictures of places of buildings in which metal ceilings are used, together with brief description of each.

They're Easy to Lay.—Milwaukee Corrugating Company, Milwaukee, Wis. Describes and illustrates American Metal shingles, gable finials, ridging, etc.

White Pine in Home-Building.—White Pine Bureau, Merchants National Bank Bldg., St. Paul, Minn. Brochure illustrating houses built of white pine, together with their floor plans and brief description. Also contains an interesting article "Some Important Aspects of Financing the Purchase and Building of a Home."

Copper, Its Effect Upon Steel for Roofing Tin.—American Sheet & Tin Plate Company, Frick Bldg., Pittsburgh, Pa. Interesting information concerning tin roofs and the nature of and manufacture of the material. Contains information on the construction of tin roofs. Tables showing number of plates required to cover a given area, cost of tin for flat seam roofing, etc.

Bright Tin Plates.—American Sheet & Tin Plate Company, Frick Bldg., Pittsburgh, Pa. Mainly devoted to tin plate manufacture, as from an address by Mr. S. A. Davis, delivered before a convention of the National Canners' Association.

Thatch Roofs.—Creo-Dipt Company, North Tonawanda, N. Y. Contains numerous photographs of residences upon which the thatched roof effect has been used.

Doorways.—A monthly magazine published by Richards Wilcox Co., Aurora, Ill. The feature of the May issue is the reprinting of an article, "How Doors Should Be Hung for Correct Swing," which appeared in the February BUILDING AGE.

Quarterly of the National Fire Protection Association, April, 1918.—National Fire Protection Association, Boston, Mass. Gives interesting information and data concerning fire protection.

Wasco Garage Heating System.—A heating system suitable for private garages, together with line drawings and wash drawings showing the manner of installation. Many testimonials as to the merits of this heating system are also contained.

Berger Corrugated Steel Cores.—Berger Mfg. Company, Canton, Ohio. Folder showing details of construction of fireproof floors with Berger Corrugated Steel Cores.

Victory Concrete Bath Tubs.—Economy Concrete Co., New Haven, Conn. Gives information concerning a concrete bath tub.

BUILDING AGE

New York, July, 1918

A Stucco-Coated House That Is Unusually Attractive

The Left Side and Front Views of the House

A STUCCO-COATED house that is unusually attractive and comfortable in appearance is that of Mr. Louis Goltz. Several interesting features contribute to make the exterior one that is more than ordinarily interesting in appearance.

At the extreme right a porch extends the full depth of the house. Stucco coated square columns support the overhang of the second story on this side. A good sized bay window breaks the plainness of the first story. Attractive flower boxes lend a summery appearance to the front of the building, and contribute in no small degree to its attractiveness.

The dormer is a bit out of the ordinary in the general handling of the roof. Brackets support a plate which bears the false rafters with their attractive sawed ends. The little break at the eaves makes the effect decidedly interesting. The exterior trim is painted white. Over the doorway there is a suggestion of the English half-timber effect in the timbers which are embedded in the stucco there.

The roof is of wooden shingles painted red. The fieldstone chimneys contrast excellently with the other colors of the house and lend an interesting accent to the left side of the residence.

The foundation walls are of selected fieldstone above grade, being well pointed at completion of the wall.

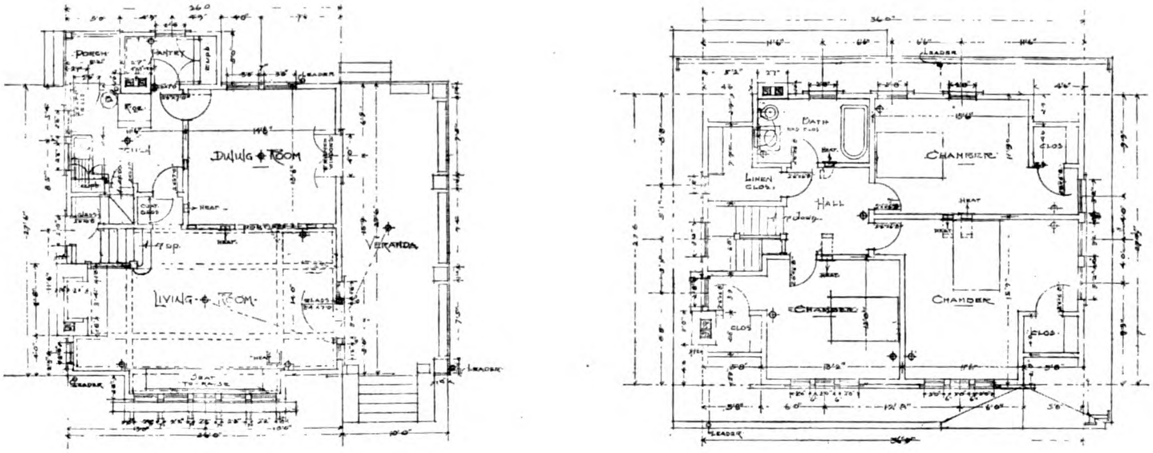
The chimney at the rear of the house, which cares for the kitchen range, is of brick stucco coated so as to harmonize with the body of the house, as contrast was not desired at this point.

Entrance is had directly into the living room. As it is located well under the porch, and on the opposite side from the prevailing winds, there is little likelihood

The Living Room

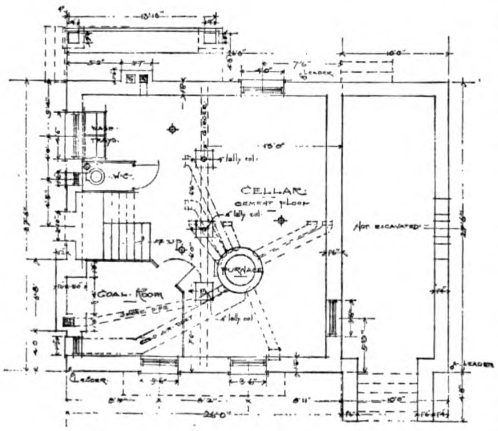
The Right Side and Front Views of the House

The Dining Room



First and Second Floor Plans, Scale 1/16" = 1 Ft.

of there being a strong draft when the door is open, which is the usual objection to no vestibule in the eastern part of the country. The living room has a beamed ceiling. A large fieldstone fireplace is placed alongside of the stairway, the combination making an extremely attractive effect as one enters the house. The living room has a large bay window, the seat of which is hinged to raise and forms a handy place for small articles.



Basement Plan, Scale 1/16" = 1 Ft.

The dining room is semi-separated from the living room by means of a cased opening, from which are hung portieres. The dining room is paneled with strips 3 in. wide and set 15 in. on centers, being finished at top and bottom with a molding. French windows open upon the veranda, thus affording access from the dining room to the veranda.

The kitchen can be entered either from the living room through a small entry, which contains a coat closet, or from the dining room. A small pantry lighted by a window and containing a cupboard forms a separate part of the kitchen, extending out beyond the house walls and forming side of the porch. The kitchen sink is placed under a window, thus receiving plenty of light, and directly at the left hand and above the sink is a cupboard. Thus dishes can readily be washed and conveniently placed in the cupboard which is close at hand.

The kitchen opens upon a small porch.

The kitchen communicates with the cellar by means of a convenient arrangement of stairs. The stairs go down from the kitchen and stop at a landing where they communicate with the outside by means of a grade door. Then the cellar stairs continue down. This grade door permits entrance to be had to the cellar from the outside without the necessity of going around through the kitchen.

The second story contains three bedrooms and a bath room, all opening from a central hall. Each room is provided with adequate closet space, and a large linen closet is placed in the hall.

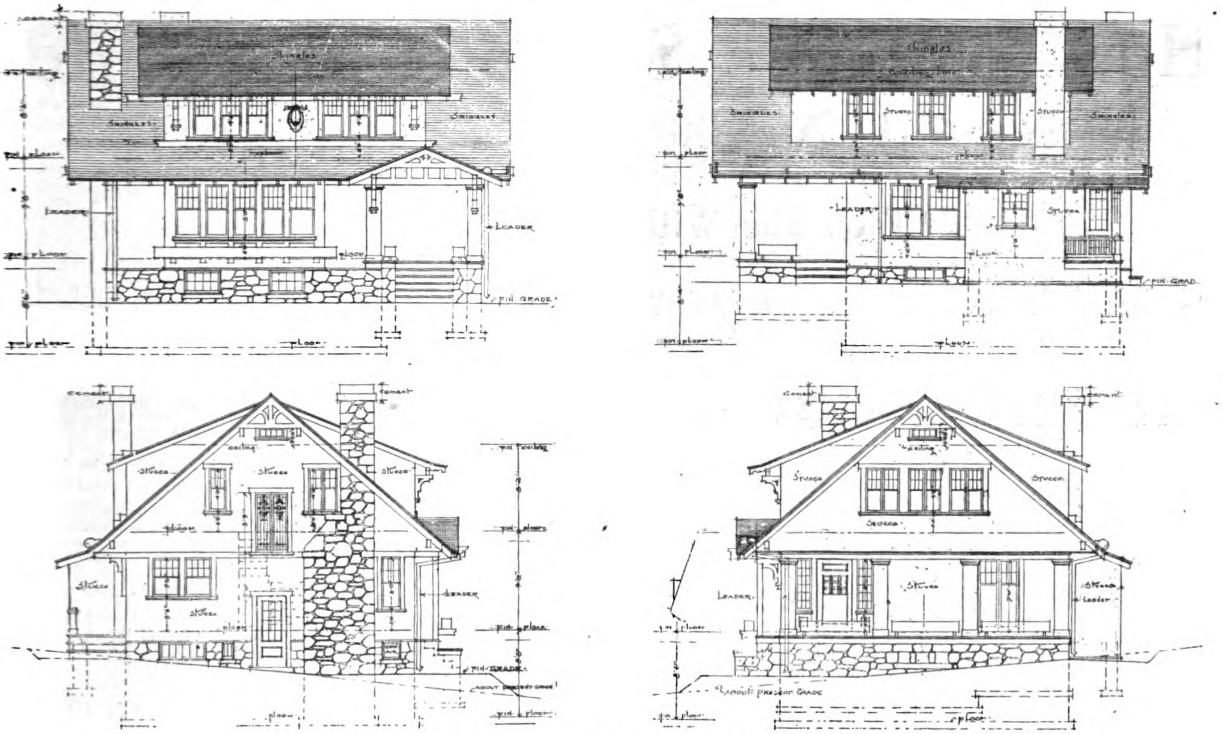
The bath room is so placed as to afford economy of plumbing, being directly over the kitchen.

Floors throughout the house are double, the finish floor being of 2½-in. wide North Carolina pine.

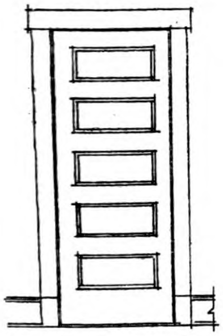
Lighting throughout is by means of electricity. Heating is by means of a warm air furnace.

This residence was constructed for Mr. Louis H. Goltz in accordance with plans and specifications prepared by W. S. Moore, Architect, 52 Vanderbilt Avenue, New York City.

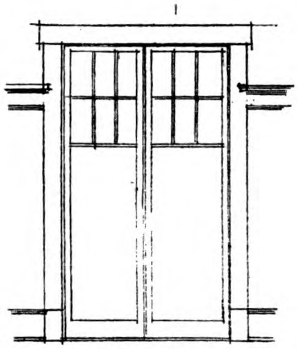
The Rear of the House



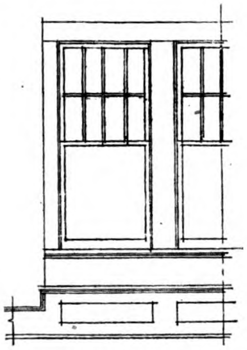
Front, Rear and Side Elevations, Scale 1/16" = 1 Ft.



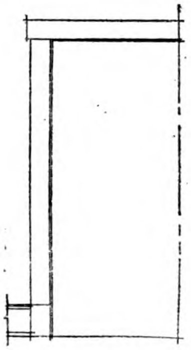
Typical Interior Doors and Trim. For Sizes See Plans



French Windows in Dining-Room



Front Windows and Seat in Living Room



Portiere Between Living and Dining Rooms

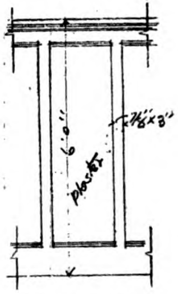
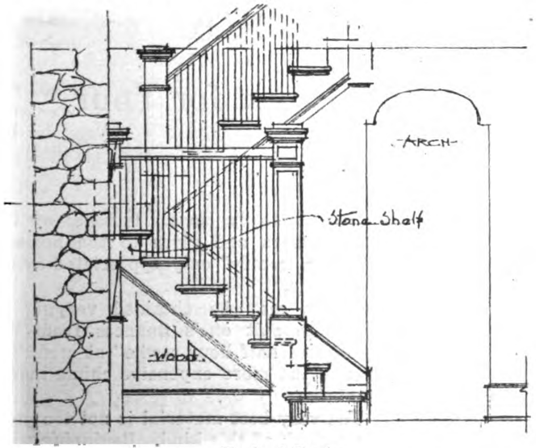
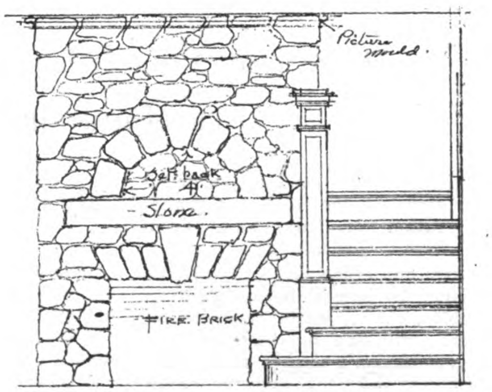


Plate-Shelf in Dining Room



End of Stairs



Front of Fireplace

Details of Trim, Stairway and Fireplace. Scale ¼" = 1 Ft.

How to Figure Size of Cistern and Material Necessary to Build It

A Handy Table That Will Save You Time in Figuring

By DeWitte C. Carsen

THERE are so many that come to me and inquire how large a cistern is necessary to hold a certain number of barrels of water and how much material will be needed to build it that I have thought it might be well to prepare a table which might be of value to those of your readers in need of information of this kind. If there is as much ignorance on the subject all over the country as there seems to be in this little city, why it may help some.

I think the cause of ignorance on this subject is that mechanics either do not know or forget the rules governing circles, spheres, segments of circles and spheres.

TABLE OF CIRCULAR CISTERNS

EXAMPLE:—I want to build a cistern to hold 100 barrels on a plot of ground 7'0"x7'0". How much material will it require?

From the table we find that a cistern 6'4" is as large as can be built on this size piece of ground. A cistern of 6'4" will hold 7 barrels in the arch, so we need 93 barrels in the body of cistern. As there is 7.06 barrels to each foot of depth, we divide 93 by 7.06, which gives us the depth below spring which is 13'2" depth of body. Adding the depth of body, height of arch, height of neck, and thickness of bottom, and we have 15' 11½" to be multiplied by 38.48 we get the excavating; multiplying 13'2" plus thickness of bottom, by 119 gives number brick around cistern to arch; add brick in arch, neck and bottom to get total number of brick. To find, plastering add the items as given in table.

Diameter in Feet and Inches	Thickness of Walls in Inches	No. Brick in Bottom, 2½" Wall	No. Brick in Bottom, 4" Wall	No. Brick in Arch, 4" Wall	No. Brick in Arch, 8" Wall	No. Brick on Side, 1 Ft. High, 4" Wall	No. Brick on Side, 1 Ft. High, 8" Wall	No. Brick in Neck, 1 Ft. High, 4" Wall	Cu. Ft. Mortar in Arch, 4" Wall	Cu. Ft. Mortar in Arch, 8" Wall	Cu. Ft. Mortar on Side, 1 Ft. High, 4" Wall	Cu. Ft. Mortar on Side, 1 Ft. High, 8" Wall	Cu. Ft. Mortar in Neck, 1 Ft. High, 4" Wall	Sq. Ft. Plaster on Bottom	Sq. Ft. Plaster on Side, 1 Ft. High	Sq. Ft. Plaster on Arch	Sq. Ft. Plaster on Neck, 1 Ft. High	Capacity in Bbls., Body of Cistern 1 Ft. High	Capacity in Bbls. of Arch	Cu. Ft. Excavating, 1 F. High	Height of Arch from Spring Inside
6'0"	4	120	170	197	.....	113	.....	32	2.28	.....	1.31	.....	.358	28.27	18.85	33.52	6.98	6.73	5.77	34.9	1'6"
6'0"	4	120	170	197	.....	113	.....	32	2.28	.....	1.31	.....	.358	28.27	18.85	33.52	6.98	6.73	5.77	34.9	1'6"
6'4"	4	137	194	223	.....	119	.....	32	2.55	.....	1.37	.....	.358	31.76	19.89	37.17	6.98	7.06	7.00	38.48	1'7"
6'4"	8	137	194	.....	499	.....	259	32	.....	5.76	.....	2.99	.358	31.76	19.89	37.17	8.73	7.06	7.00	46.16	1'7"
6'8"	4	148	209	247	.....	126	.....	32	2.85	.....	1.46	.....	.358	34.91	20.94	41.43	6.98	8.31	7.6	42.24	1'8"
6'8"	8	148	209	.....	554	.....	268	32	.....	6.4	.....	3.09	.358	34.91	20.94	41.43	8.73	8.31	7.6	50.26	1'8"
7'0"	4	164	231	274	.....	132	.....	32	3.17	.....	1.53	.....	.358	38.48	22.0	45.91	6.98	9.00	8.77	46.16	1'9"
7'0"	8	164	231	.....	609	.....	276	32	.....	7.02	.....	3.2	.358	38.48	22.0	45.91	8.73	9.00	8.77	54.54	1'9"
7'4"	4	180	253	313	.....	139	.....	32	3.83	.....	1.61	.....	.358	42.24	23.05	50.88	6.98	10.00	10.53	50.26	1'10"
7'4"	8	180	253	.....	669	.....	289	32	.....	7.73	.....	3.33	.358	42.24	23.05	50.88	8.73	10.00	10.53	58.99	1'10"
7'8"	4	196	277	332	.....	146	.....	32	4.26	.....	1.69	.....	.358	46.16	24.1	55.5	6.98	11.00	11.9	54.54	1'11"
7'8"	8	196	277	.....	741	.....	325	32	.....	8.55	.....	3.75	.358	46.16	24.1	55.5	8.73	11.00	11.9	63.6	1'11"
8'0"	4	214	302	369	.....	159	.....	32	4.64	.....	1.84	.....	.358	50.23	25.13	60.63	6.98	11.97	13.5	58.99	2'0"
8'0"	8	214	302	.....	793	.....	327	32	.....	10.07	.....	3.77	.358	50.23	25.13	60.63	8.73	11.97	13.5	68.42	2'0"
8'4"	4	232	327	402	.....	166	.....	32	4.93	.....	1.92	.....	.358	54.54	26.18	67.98	6.98	12.69	15.45	63.62	2'1"
8'4"	8	232	327	.....	872	.....	351	32	.....	10.57	.....	4.05	.358	54.54	26.18	67.98	8.73	12.69	15.45	73.4	2'1"
8'8"	4	251	354	427	.....	173	.....	32	5.35	.....	2.00	.....	.358	60.0	27.23	71.54	6.98	14.11	17.3	68.42	2'2"
8'8"	8	251	354	.....	931	.....	359	32	.....	11.56	.....	4.15	.358	60.0	27.23	71.54	8.73	14.11	17.3	78.54	2'2"
9'0"	4	270	382	463	.....	180	.....	32	5.76	.....	2.1	.....	.358	63.62	28.27	77.37	6.98	15.15	19.46	73.4	2'3"
9'0"	8	270	382	.....	1001	.....	373	32	.....	12.42	.....	4.31	.358	63.62	28.27	77.37	8.73	15.15	19.46	83.86	2'3"
9'4"	4	291	411	499	.....	186	.....	32	6.17	.....	2.15	.....	.358	68.42	29.32	83.65	6.98	16.27	21.71	78.54	2'4"
9'4"	8	291	411	.....	1078	.....	385	32	.....	13.32	.....	4.45	.358	68.42	29.32	83.65	8.73	16.27	21.71	89.36	2'4"
9'8"	4	312	440	534	.....	193	.....	32	6.35	.....	2.23	.....	.358	73.4	30.37	89.54	6.98	17.47	24.2	83.86	2'5"
9'8"	8	312	440	.....	1153	.....	399	32	.....	14.16	.....	4.61	.358	73.4	30.37	89.54	8.73	17.47	24.2	95.03	2'5"
10'0"	8	334	471	.....	1238	.....	412	32	.....	15.12	.....	4.75	.358	78.54	31.41	96.03	8.73	18.7	26.68	100.0	2'6"
11'0"	8	404	570	.....	1488	.....	454	32	.....	18.13	.....	5.24	.358	95.03	34.56	102.6	8.73	22.63	35.59	119.5	2'9"

Constructing a Hall Clock

You Can Use This Information in Building a Clock for Your Own Home or in Creating New Business

By W. A. Giesen, Architect

WILL someone send design or instruction for building a grandfather or hall clock.—From W. G., Glendale, Ky.

Amateurs and craftsmen in wood who are looking for something different to make tables, chairs, waste paper receptacles, etc., will find the building of a hall or grandfather's clock a most satisfactory accomplishment, and the result will be not only useful but an article of value that will last a lifetime.

Constructed of a pretty figured mahogany, stained a dark tone and fitted with a good grade of works, it will make an addition to the home that can be looked upon with pride.

We would not think of building a home without an open fireplace, as without it the house would not be complete. So is it with the furnishings of a home. They are not complete without the hall or grandfather's clock. It tones up the surroundings and gives to the home a sense of "comfy" only appreciated by its ownership.

Works may be obtained varying in prices to suit one's finances from the "hour and half hour strike" at moderate cost to the more expensive chime movements.

The very best material is not too good for a clock of this kind. Beginning with the material, it is advisable to get it from a reliable dealer who has on hand thoroughly dried stock from which to

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Editor's Note.—This article was prepared in answer to a request from a subscriber.

select. Such stock should have a well marked grain.

If possible, the pieces should be dressed at the mill to the sizes given on the schedule, as this will save time.

Should there not be a mill in the neighborhood that keeps the stock on hand, it can be procured at reasonable prices from the American Chime Clock Co., located at No. 1669 Ruffner Street, Philadelphia, Pa., who supply milled and molded parts, hardware and works.

To build the works, commence with the waist sides with a good joiner, plane the edges perfectly straight and square to a parallel width of 10½ in. and a length of 74¼ in. Robbet out the back edge of the inside to allow the back to set in. See cross-sections *AA* and *BB*.

The pilasters now should be planed straight to a width of 1¾ in. and to the same length as the sides. Use plenty of clamps, setting them in place first to see that the joints are well up. Sections *AA* and *BB* show the position of the pilasters on the sides.

The bottom rail 16 in. long and 6¼ in. wide should now be doweled to the edge of the pilasters, two dowels in each end. These holes may be bored clear through the pilaster into the rail. Between the dowel hole bore a ⅝-in. hole about ¾ in. deep and finish boring with a ¼-in. bit. With the dowels as guides a 2-in. screw will draw the pilasters up tight to the rail. This will make a good substantial joint if well glued. This rail may be made of poplar with the upper edge faced with mahogany. Screw a stout strip on the inside from pilaster to pilaster about 4 in. from the top to hold the sides temporarily a parallel distance of 16 in. apart.

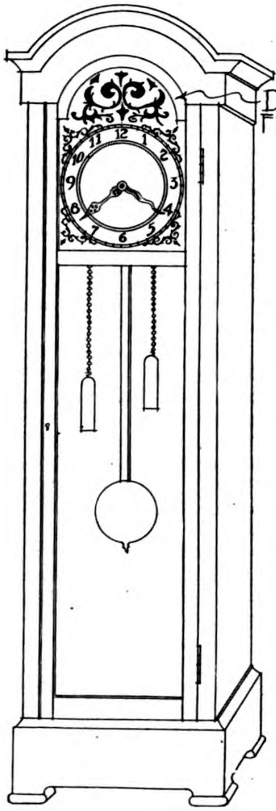
The bottom, made of poplar, 19½ x 10½ x ¾ in., may now be screwed on from underneath with 1½-in. screws.

Before putting on the base see that everything is square, paralleled and plumb. Miter the front first and cut out the scallops underneath. Glue and screw this from the inside with about 1¼-in. screws; the slides may then be fitted and glued the same way. The molding should, however, be cut on the top edge of the base before mitering.

We are now ready for the hood, and care should be taken with the joints, as the least defect will show up boldly under the finish.

The hood front is cut from a piece 20½ x 10½ x 2⅛ in., and joint *AB* shows the character of the joint where the hood returns or side pieces are joined to the front.

It will be noticed that the hood front is 2⅛ in. thick, while the side returns are only 1 5/16 in. To miter these joints it will be necessary to make the joint as represented at *AB*. An easy way to accomplish this would be to get the hood front cut in two pieces, the front one to be 1 5/16 in. thick, 20½ in. long and 10½ in. wide; the second to be 17⅞ in. long, the distance between the inside of the waistsides 10½ in. wide and 13/16 in. thick.



Perspective of Clock

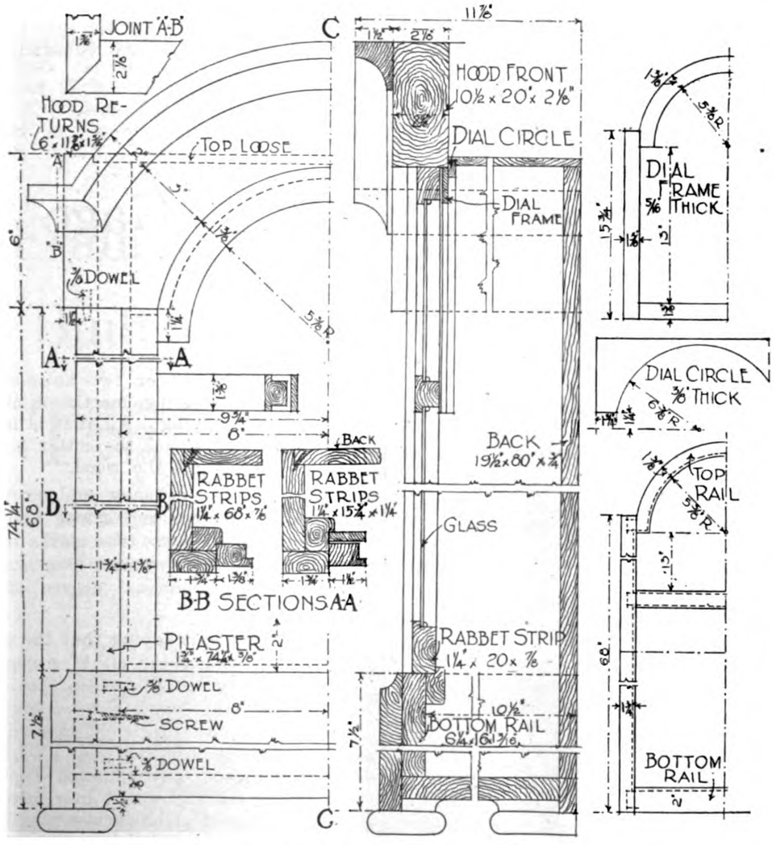
Carefully miter the front piece first, then glue and clamp the 13/16 piece in the right place.

The returns may now be mitered and fitted in place. Before gluing size the end grain at the miter joints by rubbing a thin coating of glue well into the pores. Also lay off your circles both inside and outside of the hood front. The center is 1¼ in. below the edge of the hood.

The smaller circle has 6¾ in. radius and the larger 11¾ radius, the latter circle only going as far as the top of the side return of the hood. Cut to the lines with a bandsaw and smooth up with a spokeshave. Rabbet out the top edge of the hood returns to allow the loose top to drop in (see drawing).

Care should be taken in gluing and clamping the returns to the hood, not to draw too hard on the clamps, as the circle may be contracted and held there after the glue has hardened.

The arch molding may now be worked out, mitered and glued to the hood and the return molding mitered to it. It would be advisable, however, to have this molding worked out at the mill, or the American Chime Clock Co. will supply these pieces at their best prices. If, however, it is convenient, have the mill saw out the inner circle of the arch molding first. This will give a better hold



Construction Details of Clock

on the piece while running it over the molding machine.

The base molding, the arch molding and shoulder on the arch top of the door could all be done at the mill at the same time.

The hood when completed should be doweled on the top of the sides by four ⅜-in. dowels. This will enable the hood to be taken off to inspect the works. The dowels should be glued in the hood, but not in the sides.

The dial frame may now be made (see detail) ⅜ in. thick, to fit the arch and the space between the pilasters.

The dial circle is screwed on the inside of the hood, projecting ⅜ in. This circle and two rabbet strips (see *AA*) extending downward the length of the dial frame provides a shoulder for the dial frame to rest against. Loose top rests on this.

Two more rabbet strips (see sec. *BB*) extend from the dial frame to the base, connecting with a rabbet strip across the base, and providing a place for the door to shut against. These strips should be screwed in place.

In making the door start with planing the stiles straight and parallel to width of 1⅜ in. in length they should be the distance between the hood and the bottom rail of the case.

The bottom rail of the door is 2 in. wide, the middle rail 1⅜ in. and the top or arch rail the same and laid out as called for in the detail drawing. A shoulder should be rabbeted out on the inside of all these pieces to receive the glass.

The upper or arch rail should be rabbeted out at the mill, and, like the arch molding, the inner circle cut first to make it easier to handle.

The door should be neatly mortised at all joints, the tenons only extending about three-quarters way through the stiles.

	Length, Inches	Width, Inches	Thickness, Inches	
2 waist sides	74¼	10½	11/16	See detail, Sec. AA-BB.
2 pilasters		1¾	11/16	See detail, Sec. AA-BB.
1 bottom rail	16	6¼	11/16	
2 door stiles	69	1⅜	11/16	See detail, Sec. AA-BB.
1 head rail	15	7	11/16	See detail.
1 middle rail	15	1⅜	11/16	
1 bottom rail	15	2	11/16	
1 base	48	7½	11/16	
4 block feet	3	3	11/16	
1 hood front	20¼	10½	2¼	See detail.
2 hood front returns	11⅜	6	1 1/16	
1 arch moulding	....	....	1½	
2 arch moulding returns	14	2	1½	
1 dual frame	....	....	....	
2 rabbet strips	15¾	1¼	1¼	See detail.
2 rabbet strips	47	1¼	⅞	
1 rabbet strip	20	1¼	⅞	
1 circle strip	16¼	6	⅜	Poplar.
Poplar:				
1 back	80	19½	¾	
1 bottom	19½	10½	¾	
1 top	18¼	9¾	⅜	

Schedule of Materials for Clock

It will be noted that the stock bill calls for the length of the door stiles 69 in., while the actual length of the door as fitting into the case is but 68 in. The difference has been allowed to take care of any splitting of ends of the lumber and to allow for trimming to an accurate fit. The proper length of the door stiles should be 68 in. when trimmed, but of course the door should be fitted into the case as built in each individual instance.

In gluing the door together care should be taken to keep it from getting twisted or out of square. This could be avoided by clamping it together on a true surface.

It will be noticed that the door when in place sets back about 5/16 from the pilasters and at the top still farther from the outside of the hood. Extra wide hinges should be provided in order to swing the door clear of the hood. The hinges should be set as far out as possible. The back of the case may be made of poplar. It should be well seasoned, as any contraction or expansion might start the miter joints. Panelling the back would be still better and would add to the appearance. The upper panel should start on a line with the middle rail of the door, and instead of being a wood panel the space should be covered with dark red muslin or sateen in order that the sound of the gongs may be heard more distinctly.

Before starting to build this case study the drawings, stock schedules and explanations thoroughly.

The case when finished should be well scraped with a sharp cabinet scraper and sandpapered with the grain (not across) with Nos. 1 and 00 sandpaper.

Using a Plow-Plane as a Marking Gage

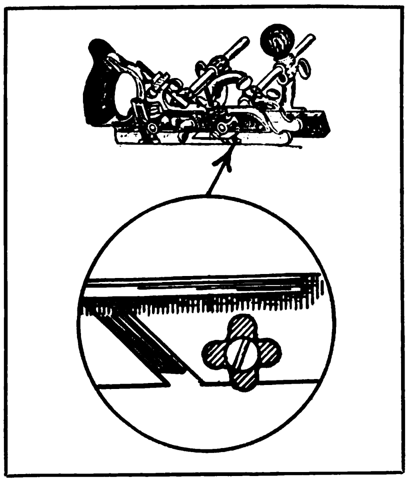
A Practical Kink That Increases Tool Efficiency

By *Henry Simon*

THOUGH most carpenters and cabinet makers own one of the adjustable plow-planes on the market, they do not generally realize that in these tools they incidentally possess a marking and mortise gage of great merit.

Such combination planes have a main stock carrying one-half of the bottom, and a movable section and movable fence, the former carrying the second half of the bottom. Each bottom or runner carries just in front of the cutter a reversible marking spur which can be put into and out of operation, though it is usually left in its operative position, as it is a help in most work. It is the duty of these spurs to travel ahead of the cutter when working across the grain or in stringy wood, and slit it to insure a clean edge.

This feature can be utilized to great advantage on many jobs of marking, making either one or two knife-marks for jointing, tenoning, mortising, chiseling or even ripping. All that is necessary is to screw back the cutter a trifle so it cannot touch the wood.



The tool being heavy and provided with large handles and a long fence, it is easy to make deep, true marks in the hardest, toughest and most cross-grained wood with an unusual degree of accuracy.

It goes without saying that the plane can never replace the marking gage, it being entirely too heavy for that. On the other hand, work most difficult to perform with the ordinary gage can be easily performed with it. And when, as often happens, all available marking gages are set and ought to remain so, the combination plane furnishes an additional gage of wide range and great efficiency.

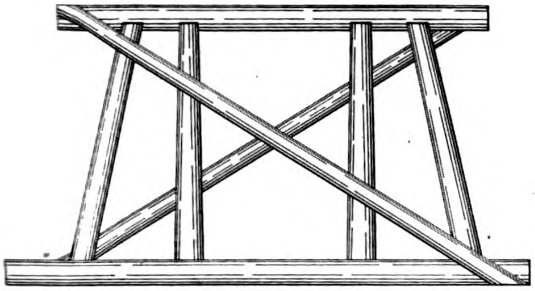


Fig. 2—Bent for Temporary Bridge

How Round Timbers Were Framed for a Temporary Bridge

By L. H. H.

A short time ago we had occasion to frame up a bridge in a big hurry so as to move a large corn crop across a ditch which was being dredged and which had caused considerable delay. The water began rising rapidly and it was a case of "any port in a storm."

We framed a bent of round logs and slabs which fitted as neatly as any square timbers could have done. The bent was framed and put together complete ready to sink in the stream in about an hour. Of course this is an old, old railroad trick, but it is handy to know how it is done. We first nailed up a trough or, as one might say, a miter box which was tacked to the log to be framed as indicated in Fig. 1 of the accompanying sketches. On this box a mark was laid on which represented the approximate center of the logs. With the steel square we laid off first the batter posts and cut with a cross-cut saw right through box and log. We then scribed with a square from the mark on the box to locate the center of the log and also to make "it out of wind." We then transferred the box and cut the second batter post by the box as sawed.

We next placed the box on the third log and scribed the plumb post and cut through it square for the plumb posts. We laid off a very heavy slab for a cap and arranged it to receive the posts which we spiked to the top of the piles with some old harrow teeth, taking care that the center lines on the piles membered with the center line on the cap.

We then spiked on a 1¼ x 8 in. plank for a still, using the same care with regard to the center lines. We then spiked this plank to a very heavy slab for a mud sill. We then cross braced the bent with some smooth slabs and it was ready to set up in the channel of the stream.

A side view of the bent for the temporary bridge is shown in Fig. 2, while in Fig. 3 is represented a cross section of the ditch in question with the bridge completed.

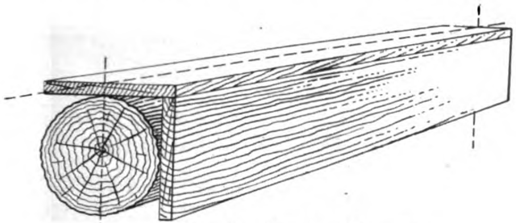


Fig. 1—Box for Framing

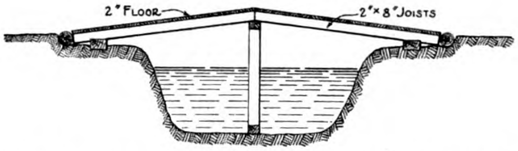


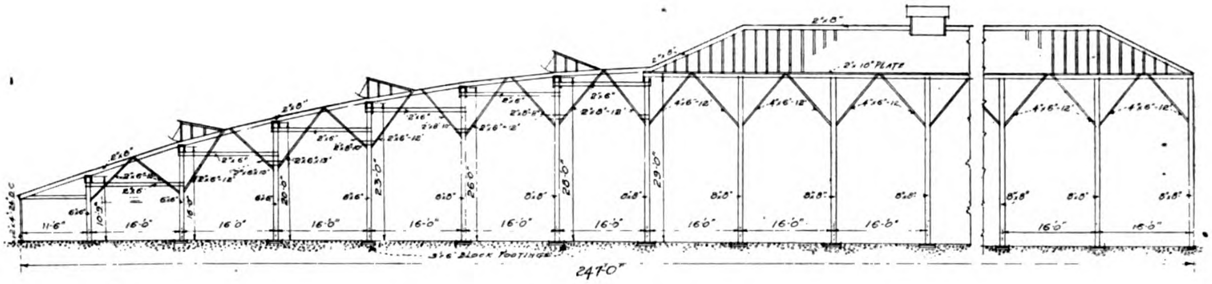
Fig. 3— Cross Section Through Bridge and Ditch

Framing Details of Billy Sunday Tabernacle Built in Chicago

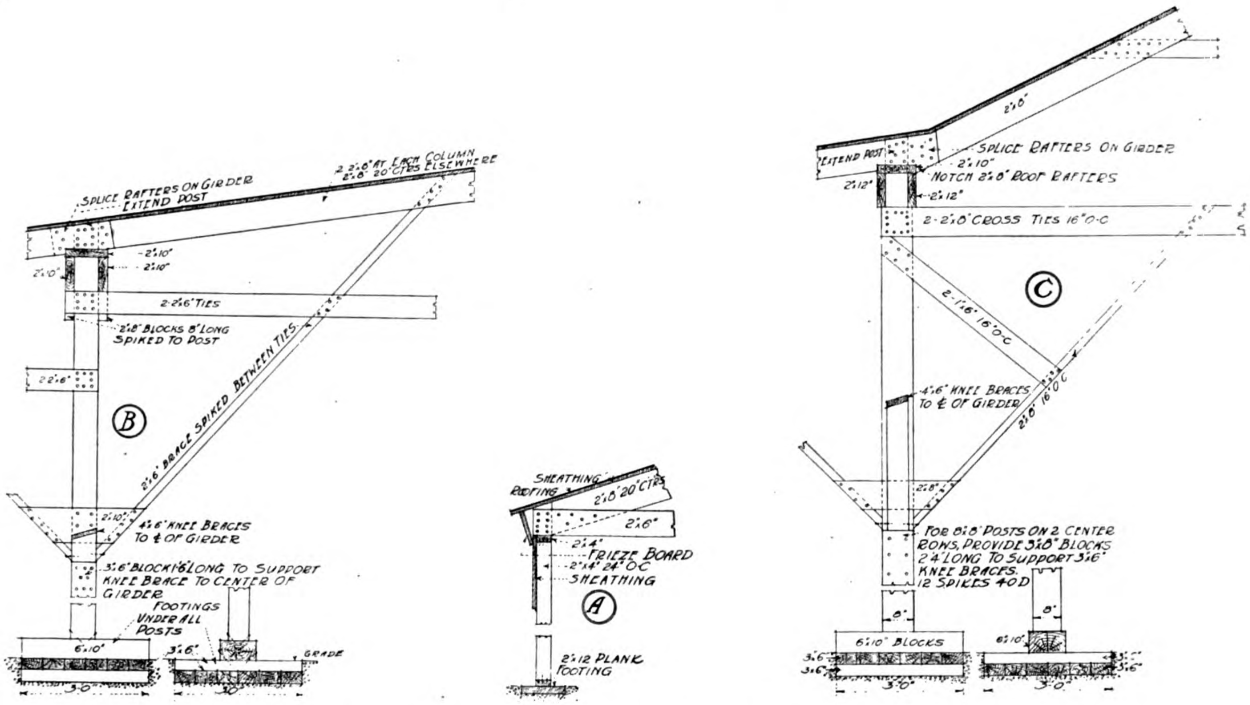
THE Tabernacle erected by Billy Sunday in Chicago for his revival campaign there a short time ago, is a good example of the type of construction favored by the evangelist as bringing out the acoustical properties which are necessary in his work. The acoustic properties are said to be ex-

The Finished Tabernacle

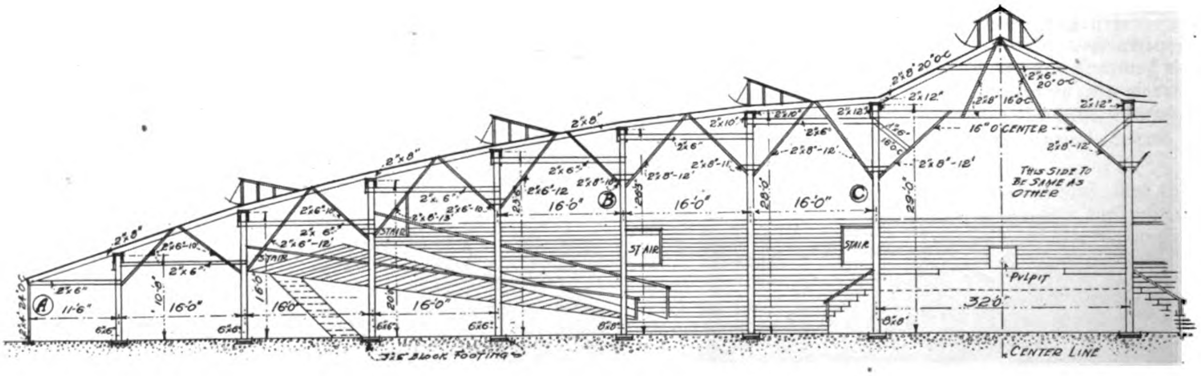
A View of the Interior



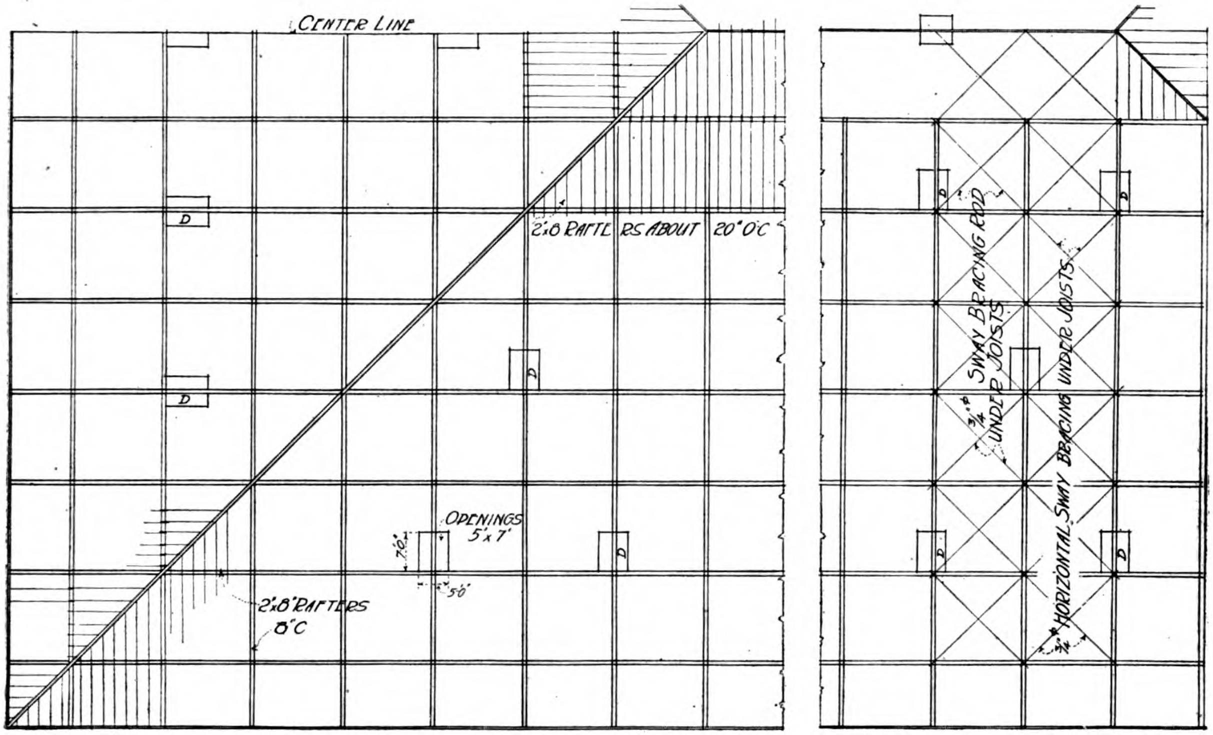
Horizontal Section of Framing



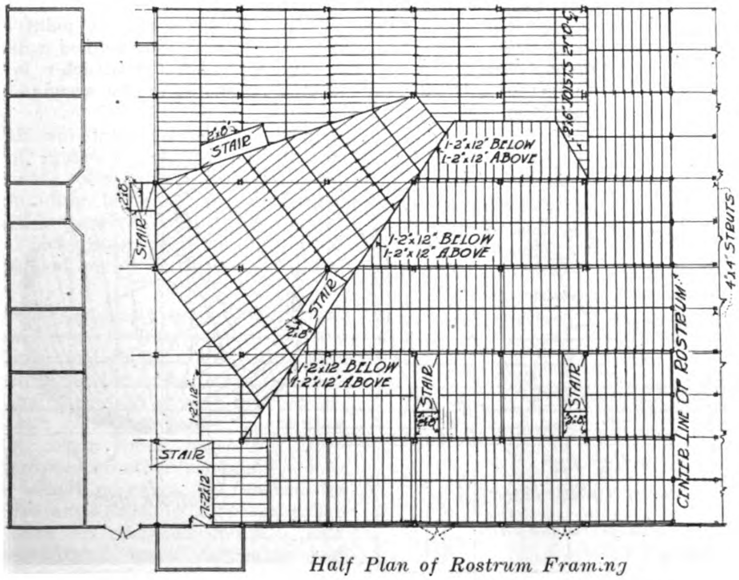
3-in. Framing Details at B, A and C of the Cross Section Below—Timber Footings Were Coated With Pitch



Cross Section of Framing Details Above



Half Framing Plan of Roof



Half Plan of Rostrum Framing

cellent, and are said to be due to three things. In the first place, the building is a thin wood shell as resonant as the body of a violin; secondly, the turtle back or ocean shell roof sends all sound waves downward, thus acting as a sounding board and shell; thirdly, this is augmented by the augophone which hangs over the pulpit.

The Tabernacle is said to be the largest erected by Billy Sunday. It is built entirely of Southern Yellow Pine lumber, of which 600,000 board ft. were used.

The building covers an area of 2½ acres, seats over 13,000 people, and cost $65,000.

The drawings which we present show the details of construction used in this type of building. They are self-explanatory and need no comment.

Construction of a Sleeping Porch

THE sleeping porch may be attached to an old building as well as to a new one, and will appeal to a great many persons who desire to bring their otherwise comfortable homes up to date, says George M. Peterson in an exchange. A sleeping porch should never be less than 7 ft. deep by 12 ft. wide, and when built to these dimensions it may be built on brackets. Post and brackets should be made of 6-ft. 6-in. white pine or cypress, and all of the exterior woodwork also should be of one of these woods. The brace, or diagonal leg, should be placed at an angle of 45 degrees to secure the greatest strength. When the brace is used without the posts to support the outer end of the porch the upper end of the brace should be at least two-thirds of the width of the room from the house, and should be placed at an angle of 45 degrees. Posts, when used, should rest on concrete piers, at least a foot square, placed in the ground to a depth of at least 3 ft., to prevent the frost from heaving them out of line and thereby lifting the corner of the porch or allowing it to settle, as the case may be. When possible, the porch should be placed on the side of the house which is exposed.

Ship Building for House Carpenters--II

If You Want to Turn to Ship Building for a While, These Articles Will Help You Out. The Author Will Answer Any Questions Concerning Ship Carpentry

By *A. H. Brenzinger*

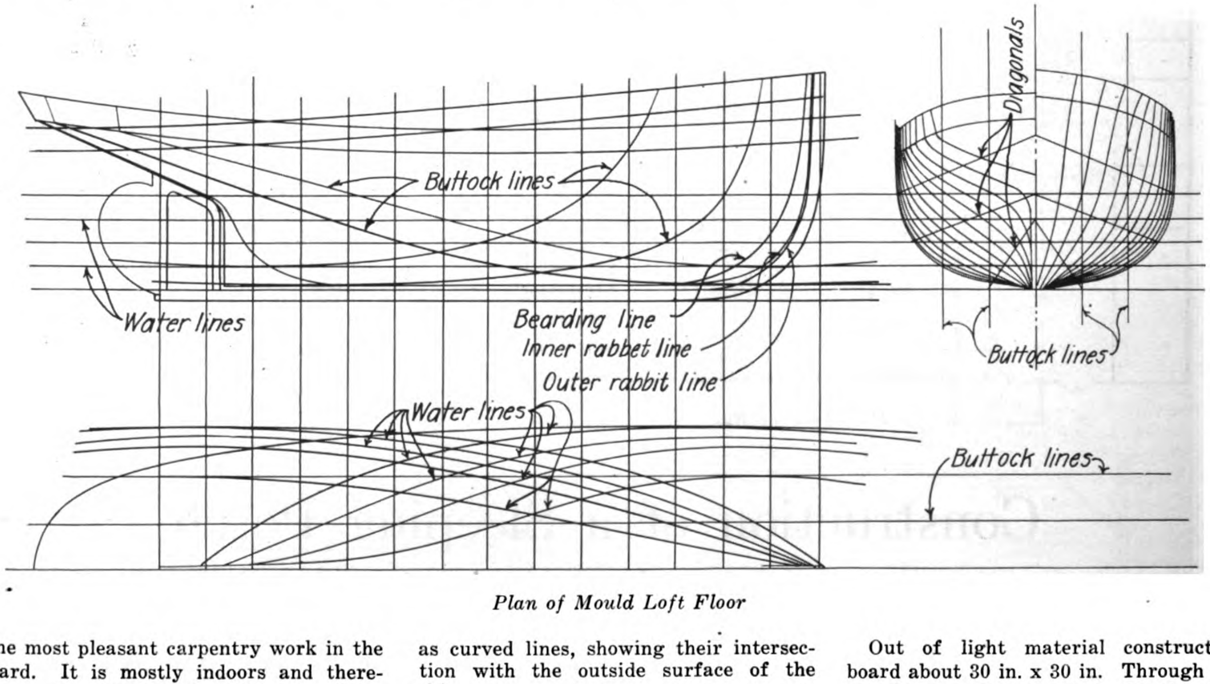
IN my previous article I described in a general way the methods employed in the construction of the wooden ship. It is my purpose in this and succeeding articles to take up more in detail the various stages of the work.

Wherever I use ship terms it would be well for you to try to memorize them and understand their meaning. I intend to end this series of articles with a list of ship terms and the names of various parts of a vessel.

In this article I am going to take up your work in the mould loft.

The loft is in charge of the loftsman, who is an expert in line and construction work. With his assistants he "lays down" the lines of the vessel as designated, changing them where they need "fairing up." He is the man to go to for information concerning your work, and don't ever hesitate to go to him for help should you ever need it.

There are usually several carpenters employed in the loft. They are known as mould loft carpenters. Their work is the most pleasant carpentry work in the yard. It is mostly indoors and therefore a great attraction in the winter time. It is the mould loft carpenter who makes the moulds for the various parts of the ship that require them.



Plan of Mould Loft Floor

As it would require a very large building to "lay down" the lines of the average vessel, full length, the arrangement as shown on the accompanying drawing, "Plan of Mould Loft Floor," is usually followed, to economize on space.

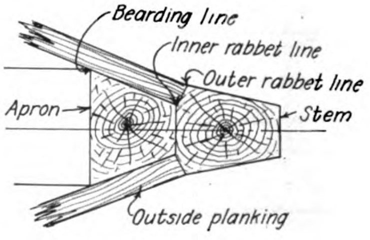
The "Body Plan" or shapes of the frames is what you will be most interested in, although you will use the other lines in making moulds for the Stem, Stern and Rudder posts, and various other shapes, but I'll take that up as we go along.

The shapes on the "Body Plan" represent the actual full sized shape at the center line of the frame.

The vertical lines on the body plan represent longitudinal sections taken on these lines; these are called "Buttock Lines." On the plan view they appear as lines parallel to the center line of the ship and on the Sheer Plan they show as curved lines, showing their intersection with the outside surface of the ship.

The horizontal lines on the body plan are called water lines and they indicate horizontal sections taken along these lines. In the plan they show as curved lines and in the sheer plan as horizontal lines parallel to the Load Water Line.

The inclined lines on the body plan are called diagonals and represent sections taken in these positions. The bevels of the frames are usually taken along these lines.



Section Through Stem

To get the bevel at any point along the frame the following method is usually employed. A bevel protractor is constructed as shown in the accompanying sketch.

Out of light material construct a board about 30 in. x 30 in. Through the middle draw the line *AB*. On this line pivot the movable leg. Draw the line *CD* perpendicular to *AB*, making the distance *E* equal to the frame spacing—

whatever that may be. Graduate the line CD to eighth inches to the right and left of the line AB and with the latter as zero.

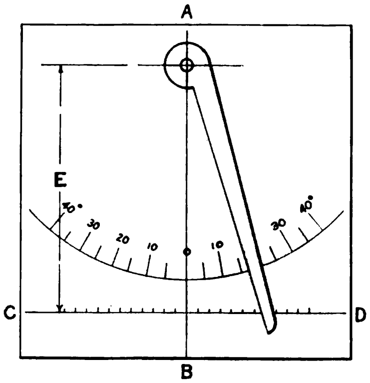
Then with the pivot point as a center draw an arc, and graduate this to degrees, with zero on the center line AB. The instrument is then complete.

To find the bevel at any point on the frame, measure on the body plan the distance between adjoining frames, along the diagonal line. Then place the movable leg of the bevel protractor, the same distance as measured, along the line CD and the correct bevels can be read on the graduated arc. Mark this in the correct position on mould of the frame. Bevels should be taken about every three feet along the frame.

The lines of a wooden vessel are designed to the outside surface of the vessel, but on the floor they are "laid down" to the outside of the frames, or the inside of planking.

The "Outer Rabbet Line" is at the intersection of the outside surface of planking with the surface of stem, keel, deadwood, etc. The "Inner Rabbet Line" is the inner angle of the rabbet cut. The "Bearding Line" is at the intersection of the inner surface of planking with the surface of the stem, keel, deadwood, etc. It is essential that you understand these three lines.

Lines from the loft floor are "lifted" or transferred to the moulds in a very simple way.



A Bevel Protractor Used to Get the Bevel at Any Point Along the Frame

A light batten is fitted with arms, about 36 in. long, and fastened at right angles to the batten about every two feet. A nail is fitted at the outside end of the arm. The outside of the batten is laid along the line to be lifted and when it is in the right position the nail in the end of the arm is driven. This will hold the batten in its correct position, but will permit it to be raised slightly to allow a light piece of pine to be slipped under it. By drawing along the batten you will have the correct line on the mould.

The inside and outside of the frame is transferred in this way and when cut to these lines we have a mould.

The bevels are then marked on it in their proper place and all other notations put on and the mould is complete. Moulds for other items, such as the stem, stern post, rudder post, "harpins," etc., are lifted in the same way. A standard mould is also made for the scarfs in the keel, keelsons, stringers, etc.

Remember that accuracy is all essential at every stage of this work.

(*To be continued*)

How Lockers Were Remodeled to Comply with Fire Regulations

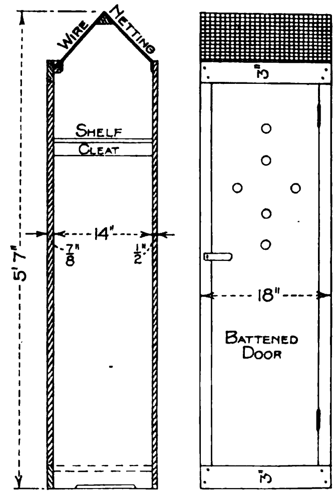
By Owen B. Maginnis

THE whirligig of time, the changes of systems, and the issuance of new rules and regulations by building, insurance and municipal authorities produce many original and unusual ideas in carpentry and building construction, one of which is the following:

There has recently been promulgated an order, more or less mandatory, that in all office and factory buildings where overhead sprinkler systems are installed there shall not exist on any floor an inclosed box closet, or locker, containing clothing, cotton waste, paint, oil, gasoline, kerosene or other combustible materials which may not be reached by water for extinguishing purposes either from hose or sprinkler heads. This has necessitated much carpentry and other mechanics' work. For example, all platforms of wood or iron have to be drilled full of holes 1 in. in diameter and spaced approximately not more than 6 in. apart. The tops or covers of all clothes or other storage lockers or closets must as soon as possible be made porous, or perforated, or covered with wire netting so as to fully allow the interior and contents to be easily and rapidly flooded in case of spontaneous combustion, contact or fusion of electric current wires or for any reason whatever.

In this connection the master mechanic of one firm in New York City evolved the original design of locker seen in the attached sketches, which has two important features. First, it made an excellent new style of locker and, second, it continued the use of the old lockers by simply remodeling their covers or tops.

Its very simplicity is the best part of it. Principally it is just the usual box locker or closet, 18 in. wide across, 14 in. deep and 5 ft. 7 in. high to the peak of the little open roof. It has the hat shelf, with hat and coat hooks underneath, but the shelf is bored through by 12 1-in. holes to permit of needed water to drain through its surface door to the clothes or contents below. The little roof has ⅞-in. board gables nailed to the sides of a 2-in. ridge tree and is covered with ½-in. mesh wire poultry netting fastened in with ¾-in. copper staples. The door, of the common battened form, is hung to the right, bored with six holes for air circulation, and secured with staple and padlock. None are painted, this surface being inflammable. The object of the little pitch roof is that no boxboard or other material may be placed on its top, and it is a stringent rule that all personal property must be kept inside each locker.



Cross Section and Elevation, Showing How the Lockers Were Remodeled

It might be said that this innovation is objectionable on account of the liability of dust or other floating particles in the air accumulating and lodging in or on the contents of each. The object here insisted on is not sanitation, but safety, which in the larger factories and workshops, where many people of both sexes are daily employed, is absolutely essential. The lockers are easily dusted, swept, kept clean, and as a means of fire prevention or extinguishment the whole idea is admirable.

Some Echoes of the Noon Hour—XI

Efficiency Kinks That Give Some Worth-While Ideas That You Can Apply in Keeping Track of Tools

By Edward H. Crussell

"What Have I Forgot Now?"

"WELL," said Bliss, as he arranged his seat and tested it for slivers with "a large and sinewy hand," "in spite of all our aviation schools, old Father Time is still one of the best fliers we've got. A few days ago we were all hunting for the sunny spots, now there's hardly shade enough to go round. To-day we're all growling about the heat and in a little while we'll be pulling our caps down round our ears, stamping our feet, and wishing it was summer again. We're a dissatisfied bunch."

"Speaking about dissatisfied people," began Farmer; "I heard a lot of dissatisfied talk up on the second floor this morning. What was the trouble between you and the Old Man?" he inquired of the Kid.

"The Old Man Blew Me Up Because He Didn't Like the Way I Was Piling the Flooring"

"Oh, nothing much," was the reply; "he didn't like the way I was piling the flooring. I wouldn't have minded," he added, naively, "but he accused me of having no more system than a farmer, and that got my goat."

The others suspected (what Farmer knew) that the latter part of this assertion was a fabrication of the Kid's consequently it was greeted with a generous giggle of applause.

"I used to think that there was a great deal of exaggeration in what I read and heard about the farmer's lack of system and efficiency," said Bliss, "but I'm beginning to believe that much of it is true. A number of us clubbed together out in the suburbs, where I live, and undertook to plant some vacant lots with potatoes. We hired a farmer to do the plowing, and after watching him for a while I'm about ready to believe that he and his kind do use up twelve or fourteen hours of daylight and then go around another three or four hours with a lantern in order to do half a day's work."

"Well, my sympathies are with the plowman," said Scotty; "I daresay he was poor, all right, but I'll bet he earned every cent he got from you."

"There was no trouble about that at all," said Bliss, "because we had a contract price on the job; what I was interested in was his slipshod method of work. For example, I heard him tell his partner that when he got down to my end of the lot he was going to quit, so I waited to see him do it, and this is what I saw. He drove down to the end, turned his team around, set his plow in again and then proceeded to unhitch."

"Well," inquired Shorty, seeing that Bliss was waiting for comments, "what's wrong with that? That left him all ready to start the next day's work, didn't it?"

"Maybe," was the answer; "but what I thought wrong with it was this: if he had stopped his plow at the end of the furrow, he could have unhitched while his team was standing in the road and they would have been ready to start for home. As it was, he had to go scrambling over the plowed ground to unhitch and then had to drive them back over it again to get them out into the road. In the morning he would have to do more floundering around on the plowed ground in order to get hitched up again. It looked like a foolish proceeding to me, but perhaps our friend here can enlighten us as to the reason for it?"

"Your observations, Bliss," replied Farmer, "convince me of two things: first, that your plowman was not a farmer, and, second, that at some time in your existence you have been one. I hold no brief for the farmer, and, feeling as I do, highly complimented with my

TOOLS FOR FITTING MORTISE LOCKS

1. Rule.
2. Pencil.
3. Marking gage.
4. Brace.
5. Bits 3/4", 5/8".
6. Chisels 1/2", 1".
7. Hammer.
8. Automatic drill (?).
9. Spiral screwdriver.
10. Compasses (?).

*If with cylinder keyhole, add expansive bit and small saw file.

Fig. 2

new nickname, I do not think it would be exactly proper for me to undertake their defense. At the same time, I realize that you follows, like a lot of others, are extremely ignorant in matters not directly connected with your own line of business, and I think it my duty to do what I can to set you right in this particular case.

"The farmers, as a class are both progressive and efficient. Their machinery is more up to date, they use more of it, and do more work, with less man power, than any other class of people on earth. We might argue about this all summer without settling anything, so in order to explain what I mean, I'll give you an illustration suitable to your understanding.

"You remember that when we were working on that foundation form a couple of weeks ago the Boss here brought out a coil of wire for tieing the forms. You may also remember that when I made a reel for the coil of wire so that it could be used without being entangled and wasted, he thought the idea worthy of comment. Well, the farmer uses a great deal of that same kind of wire in his hay baling operations, but he doesn't have to bother about keeping it in shape; his wire is already cut to length and comes to him in bundles; all he has to do is take hold of the end and draw it out. Some day I expect a farmer will enter the building business and then we'll get our wire already cut to the proper length, the short lengths in boxes and the long lengths in bundles."

TOOLS FOR FITTING AND HANGING DOORS

1. Rule.
2. Pencil.
3. Try square.
4. Panel saw.
5. Rip saw (?).
6. Fore plane.
7. Butt gage.
8. 1 1/2" chisel.
9. Hammer.
10. Automatic drill.
11. Spiral screwdriver.
12. Compasses (?).

Fig. 1

"There's a good deal of common sense in what you've been saying," remarked the foreman; "but you wouldn't give all the credit to the farmer, would you?"

"I suppose you mean that the credit should be given to the manufacturers of baling wire and farming implements?" said the other. "All that I have to say to that is the firm that makes the hay baling ties is the same one that made the coil of wire we were using and they'd probably cut wire to length for concrete forms if there was a call for it."

"Well," admitted the foreman, "you've made a remarkably good case for the farmer as far as you've gone, and I'd like, while you have the floor, to have you tell these fellows about those cards of yours that I was looking at yesterday."

After some demur and argument Farmer explained to the others: "The boss is alluding to some little cards I fixed up to assist my memory on certain classes of work. We handled a lot of jobbing work at my last place, and I often found when called upon to go out and hang a door or put on a lock or something of that kind, that when I got out to the job I had forgotten some important part of my equipment, even though I had thought the matter over very carefully before leaving the shop. The same trouble would sometimes occur when gathering up my scattered tools at the close of a job. I would often leave one or more of them behind through not remembering I had brought it with me. To avoid all this trouble I fixed up a set of cards, each card carrying a list of the tools needed to do some one thing. I first wrote out the lists and after making sure they were correct, had a friend typewrite them for me on the regular 3 x 5 card that can be obtained at any stationer's. Kid, if you'll run over to my box and get a couple of them, I'll not have to do so much explaining and the boys will get a better idea of the scheme."

The Kid soon returned with a small box of cards, of which Figs. 1, 2 and 3 are samples. While they were being passed around Farmer explained: "Of course, as you will see, not all of the cards carry lists of tools, and not all of them are typewritten. Here's one with a printed list of rafter lengths for different pitches. I cut that out of a magazine; I don't generally use it for getting the lengths of rafters, but if at any time I am in doubt I can refer to it and check my figures instantly. This one (Fig. 3) shows a table of multipliers for polygons. I think you'll see how it works; if, for example, you want to construct a seven-sided polygon in a circle of a given size, you multiply the diameter of the given circle by the figure in the table; the answer gives you the length of one side. Here's another showing the proper method of fitting 'Blank's' door-check and spring. This information comes packed with the article. I merely trimmed it down till it would fit the card. Now, whether I'm fitting a new check or an old one, I have all the data handy. The other side of the card lists the tools needed for applying the spring."

"Seems to me," began Shorty, "that these lists need some correcting. For instance, I think there ought to be a nail set added to the list for fitting and hanging doors; there are more door jambs with nailed stops than there are with rabbeted ones."

"I don't believe in unlucky numbers," grinned Farmer; "and there are already twelve articles on the list."

"Then why not cut out one of the

MULTIPLIERS FOR POLYGONS

Seg.	Factor	Seg.	Factor	Seg.	Factor
3	.86603	11	.28173	18	.17365
4	.70711	12	.25882	19	.16460
5	.58779	13	.23932	20	.15643
7	.43388	14	.22252	21	.14904
8	.38268	15	.20791	22	.14232
9	.34202	16	.19509	23	.13617
10	.30902	17	.18375	24	.13053

Multiply the factor corresponding to the given number of segments, or sides, by the diameter of the circle in inches.

Fig. 3

others? What do you want with compasses when fitting a door?"

"It is not supposed that these lists will suit everybody," explained Farmer; "there are few things that will stand universal criticism. If you look closely you will see that some of the tools are followed by a (?) mark; this means that they may sometimes be omitted. As for the compasses, I *have* used them for scribing off the bottom of a door when it is to be fitted with a threshold. The cards were devised more especially for jobbing work, and there is a difference between going out of the shop to fit just one door and fitting doors straightaway, two or three days at a time. I prepared the cards for my own use and, until the boss suggested it, I had no thought of showing them to anyone else. I have found them extremely useful; and, I think," he continued with a grin, "that when I get them complete I'll have them set up and printed; there ought to be a good sale for them at about a dollar a set."

"I believe you've got a good idea there," said Bliss. "Lookout some one doesn't beat you to it—the printing of the cards, I mean."

" 'Let 'em all come,' " quoted the other; "I can't stop them printing cards, and wouldn't if I could. They can't print my ideas without my permission, and if their ideas are better or more salable than mine, let the best man win."

"Speaking about new ideas," said Old George, "I've had one or two of my own at different times. How many of you can remember the days before we had coping saws? I don't want to lay claim to being the inventor of the idea of using a fine saw for coping moldings, but I do claim that I was the first one to put the idea into print. Twenty years ago, which is long before you will find our present day coping saws mentioned in advertisements or tool catalogs, I wrote a letter to *Carpentry and Building* advising the use of a small fret saw, or, as it is sometimes called, bracket saw, for this purpose, and any of you that want to can look it up in the back files at the city library. Of course I had used the idea some time before I wrote about it."

The argument started by this statement was cut short by the sound of the whistle.

(To be continued)

How to Construct Double Hung Windows

Important Points in Sash and Frame Construction That Make for the Best Results

By Ernest Irving Freese

WITHOUT fear of contradiction, it can be stated that the double hung window, properly constructed, is the most satisfactory type of window in existence, not only from the standpoint of weather exclusion but also from the standpoint of convenience in operation. And the double hung window is essentially an American invention, which fact is sufficient evidence in proof of the foregoing statement: A Yankee may not be the most artistic creature of the human tribe, but his productions are thoroughly practical. So, when our forefathers turned their ingenious efforts toward the production of a contrivance that would admit fresh air and sunshine and, at the same time, be "handy" to operate, they produced the thoroughly practical double hung window.

But this article is not an essay on the double hung window—although one might well be written on this subject. It is my purpose herein to describe and illustrate some of the seemingly insignificant, but none the less vital, points that ought to be incorporated in the construction of all double hung window frames and sash. I have said that the points in question are seemingly insignificant because of the fact that they are so persistently overlooked or deliberately disregarded. But listen:

Does the spectacle of rain running down the inside of a window pane, or oozing in underneath the sill, make a joyful sight?

Does the sifting dust that blows in through a loosely constructed window enhance the appearance of the carpets and furniture?

Is a draught down the back of one's neck from "somewhere around the window" an essential to health and comfort?

Does the rattle of a wind-smitten window pane, or the jangle of sash weights, sound like music?

Does a tightly stuck sash merely offer an opportunity for muscular exercise?

Is a sprung or sagging meeting-rail a thing of beauty?

I have set down the above queries to make emphatic some of the evils resulting from a badly constructed window, and to thereby give reason for my insistence upon the "seemingly insignificant" points of construction that will eliminate those evils. General Sherman once said—but everyone knows what Sherman said. In fact a goodly number of people have said the same thing—about badly constructed windows.

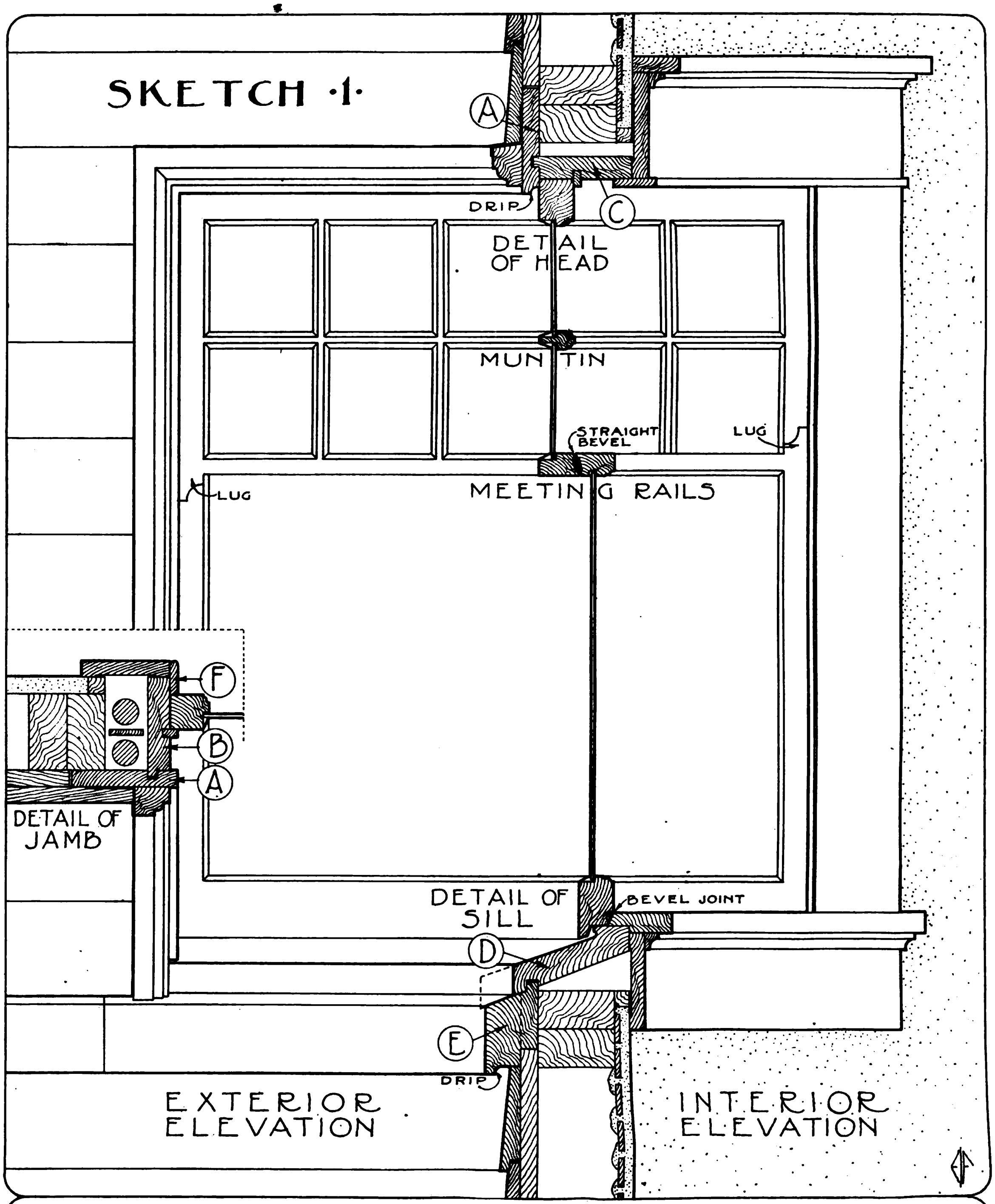
The accompanying sketches illustrate, in completeness and detail, the construction of a typical double hung window for both a frame wall of 2" x 4" studding and a 12" brick wall. The details and form of mouldings are, of course, subject to variations to conform with particular conditions and individual taste, but the principles involved should be strictly adhered to if the best results and ultimate economy are desired.

The essential parts of the window frame are the exterior casings "A," the pulley stiles "B," the yoke "C," and the sill "D."

In frame construction, the exterior casings should be set flush with the sheathing and be wide enough to not only cover the weight box but to lap well over onto the studding so as to afford a rigid nailing as well as to insure of a thoroughly weather tight job. In a masonry wall, these pieces should be set back, either 4" or 8," against a shoulder in the jamb, as clearly indicated in sketch No. 2. In no case should the exterior casings be thinner than ⅞", nor narrower than 5½". And at the head, the casing can be dropped about an inch lower than the yoke so as to allow of a "drip" being formed on its lower edge as shown in sketch No. 1. However, if outside screens are to be used, the drip should be omitted.

The pulley stiles and yoke should invariably be tongued into the exterior casings. This precaution not only makes for a more rigid and workmanlike job but also makes the joint effectively water tight and lessens the liability of the stiles becoming warped which, in turn, lessens the liability of the sash becoming stuck. Also, because of the fact that the pulley stiles are greatly weakened by being plowed for the parting beads, good construction dictates that they should not be less than 1⅛" in thickness. This also affords a more substantial nailing for the inner and outer casings. In the tongue and groove joint between casings and pulley stiles, it is somewhat common to see the tongue worked on the face side of the stile. This is a mistake. In

a tongue and groove joint, the projection of the tongue is made slightly less than the depth of the groove. Hence, in the case under discussion, if the tongue were on the face side of the stile, the projecting end of the stile, which also forms the outer sash stop, would tend to bend inward in nailing and thereby lessen the width of the channel in which the sash were to slide. The result would be a badly fitted or tightly stuck sash. An invariable rule, then, is to place the *shoulder*, not the tongue, on the face side of the stile as is shown in the accompanying sketches.

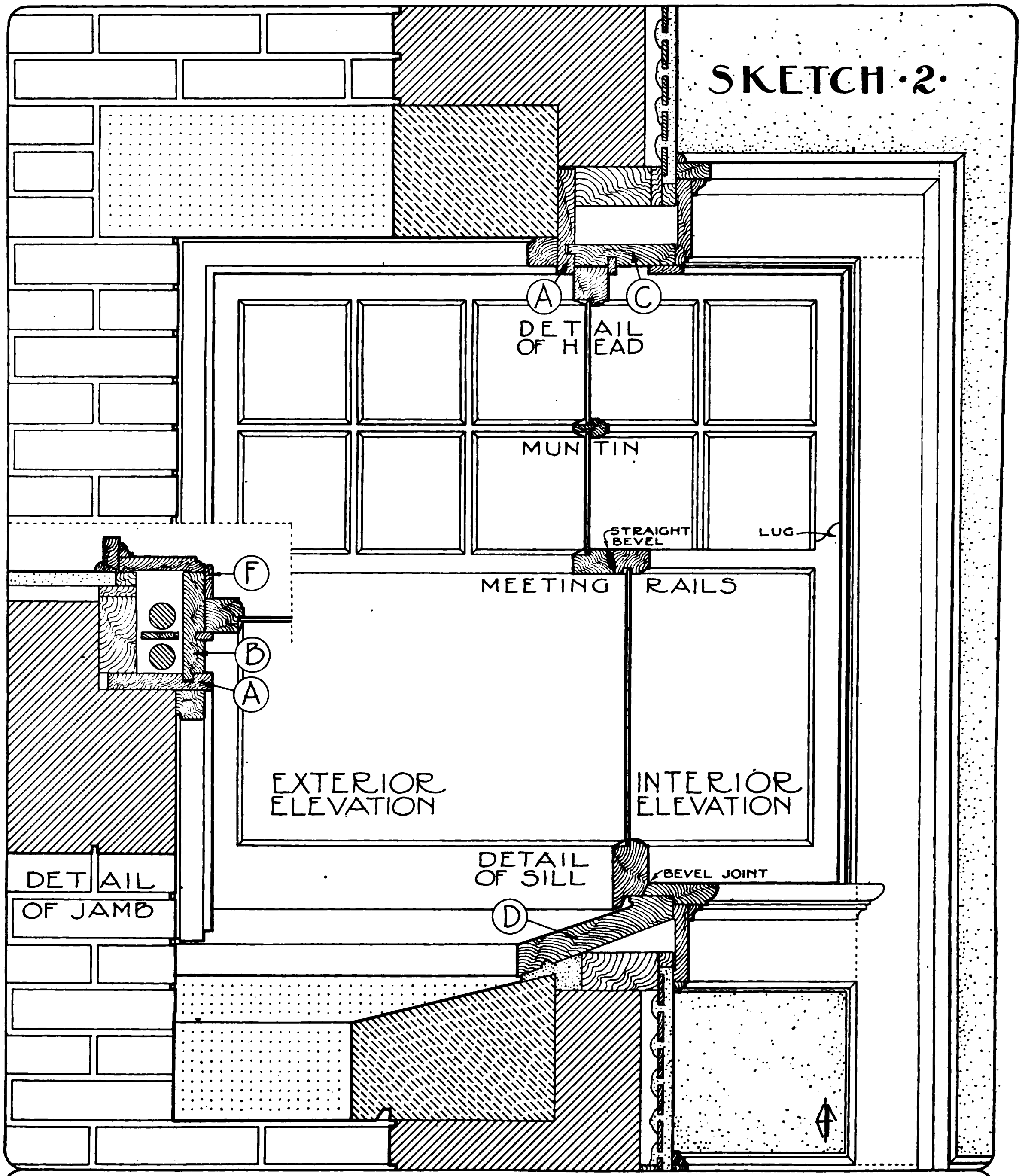


TYPICAL DOUBLE HUNG WINDOW
FOR A 2" x 4" FRAME WALL
SCALE 12 INCHES

Window sills, as commonly made, are not given enough slope. A pitch of 1" in 3" should be considered the minimum.

This not only gives a much better appearance, but sheds water better and quicker and retards wind-blown rain from backing up the sill and entering the joint between sill and sash. The sketches illustrate a form of joint between sash and sill that has been proven to be highly effective against the entrance of moisture. A stream of water from a hose can be turned against a joint of this type without fear of moisture penetrating to the inside of the building. It also effectually breaks up capillary attraction.

The sub-sill shown at "E" in sketch No. 1 is not a structural necessity, but, where used, adds greatly to the architectural appearance of the window. It is often made continuous, thus forming a belt, or sill course, around the house at the height of the window sills. It should be tongued into the main sill as shown and have a drip worked on its lower edge. The dotted lines in the



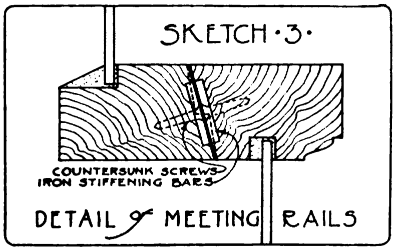
TYPICAL DOUBLE HUNG WINDOW
FOR A 12 INCH BRICK WALL
SCALE 12 INCHES

sketch indicate the extension of the main sill as ordinarily done when the sub-sill is omitted.

To prevent the disagreeable noise of clashing sash weights, a ⅝" wooden parting strip, or "pendulum," should be placed between the weights. This strip must be hung at the top and left free at the bottom so as to be readily moved aside to allow access to the weights through a pocket in the stiles. The weight box itself should be at least 2¼" deep. For unusually large size windows, square weights should be used, as they are nearly 30 per cent heavier than round weights of the same diameter and length.

The inside sash stop, shown at "F" in the sketches, should be beaded as indicated and secured to the frame with screws set in slotted metal sockets. This simple and inexpensive means of fastening should always be insisted upon, for it allows of the stop beads being moved slightly inward or outward so as to render the sash either freer or tighter as subsequent conditions require. If the stop beads are not adjustable, any slight swelling of the sash or surrounding woodwork will cause the sash to become stuck fast, or, on the other hand, dry weather shrinkage will cause it to become so loose as to beat a chattering tattoo upon the stops and parting beads every time the wind blows.

Another preventative of rattling sash and, at the same time, a further assurance of weather tightness, is a straight bevel joint between the meeting rails, and also a bevel joint between the window stool and the bottom rail. When the sash are locked tightly together at the meeting rails, these two bevels set up a wedging action in the upper and lower halves of the sash and thereby bring them into tight contact with each other and with the stool, window head and parting beads. It is common practice to make a lap joint at the meeting rails as indicated by the dotted lines in sketch No. 3. There is no logical reason for so doing. A straight bevel is much simpler and much better.



Ordinarily, the meeting rails of a double hung window occur midway between the head and sill—just about on the line of sight. This condition is unfortunate, both from the standpoint of the spectator and from the standpoint of the meeting rails. But the meeting rails suffer the most, for the reason that they are made very narrow and therefore structurally weak, so as not to materially obstruct the vision. The result is that the meeting rails, lacking the proper degree of stiffness, are often pulled away from the glass upon the opening of the window. I am aware of the fact that the lower sash should be lifted by means of the bottom rail, and that there are various countersunk devices that allow of a fingerhold therein. I am also aware of the fact that people continue to open windows by means of the meeting rails. Theoretically, they don't. But practically they certainly do. And my concern here is with practice, not theory. For this reason I set it down as an invariable rule that all double hung sash exceeding 30" in width should have the meeting rails reinforced with a wrought iron bar let into their beveled faces and securely screwed to same as illustrated at large scale in sketch No. 3. Projecting lugs should also be left on the ends of the stiles, as shown in sketches No. 1 and No. 2, so as to afford a firm anchorage for the end tenons of the narrow meeting rails. The only alternative is to raise the meeting rails above the line of vision—say from four to eight inches above the middle of the window—and make them of the proper thickness. This, of course, does not allow of the lower sash being opened to its full extent, but it would seem that this point could be sacrificed in view of the better construction and the better architectural effect obtained by placing the meeting rails decidedly above the center of the opening.

Prices in 1916 and 1918 Compared

What a House Built This Year Would Have Cost Two Years Ago

By John Upton

I RECENTLY noticed an item in our Watertown daily relative to the high cost of living and building. A man had just completed the building of a six-room house. In his opinion the present high cost of building is the principal reason why people are not erecting houses for renting purposes, to aid in solving the housing problems of our cities.

The house which he built is of the bungalow style with a porch across the front and a small one at the rear with an outside entrance to the cellar. He gives the following data as regards the cost, which I have compared with 1916 prices:

House, 24 x 26. Cellar Wall of Cement Blocks

1918		1916
$300	Cost of excavation and cellar wall	$250
75	Concrete bottom of cellar	60
100	One coat patent plaster throughout the house	85
25	Lathing, labor only	15
75	Hardware, nails, hinges, locks, etc.	40
300	Plumbing, fixtures, kitchen sink, range boiler, laundry, toilet, bath	200
1,000	Lumber, windows, inside finish Georgia Pine; clapboards, No. 1 Pine; all lumber and lath	850
40	Material and labor on chimney—cellar to top	30
50	Slag roofing, three-ply	35
60	Paint for two coats; labor	35
35	Varnish and labor; two coats inside	25
600	Labor—carpenter and helpers	500

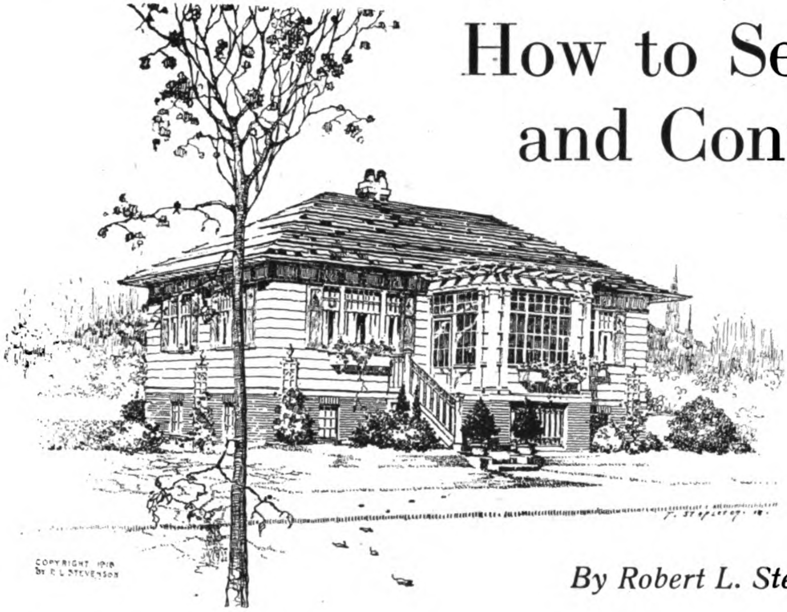
I obtained a bill of material from the owner and builder. In figuring up the quantities I find the total cost at 1916 prices would have been about $2,125.

I have taken prices given by a lumber company on this house in 1916 and on the same in 1918. The prices on the largest items, the material, practically agree with those which I give. For further data I have taken the prices given by a mail order house in 1916 and again in 1918 on a number of houses, and find the advance average some 26 per cent. Labor, masonry work and material will have about the same rate of increase, therefore I believe we can call this about the actual rate of increase in the cost in the last two years.

The cost of this house to-day is $2,660 without any decoration. It would cost $15 to have the plaster tinted throughout the house. It would cost $30 to have the house papered.

These figures do not include land. If rented at the average of $25 per month it would produce an income of $300 a year, from which the taxes must be paid and the repairs must be made, a good investment.

As to whether the farmer should build now, the following will tend to show that he should. In 1914-15 a big two-horse load of wheat would buy 3040 ft. of siding. Now the same load will buy 4400 ft. of siding. Wheat is not the only farm product which has advanced in price, for all have followed suit—corn, oats, pork, milk—any of them will buy more lumber than before.



How to Secure Economy and Convenience in a Floor Plan

This Article Describes a New Type of Dwelling Which Is Meeting the Demand for Household Efficiency

By Robert L. Stevenson, Architect

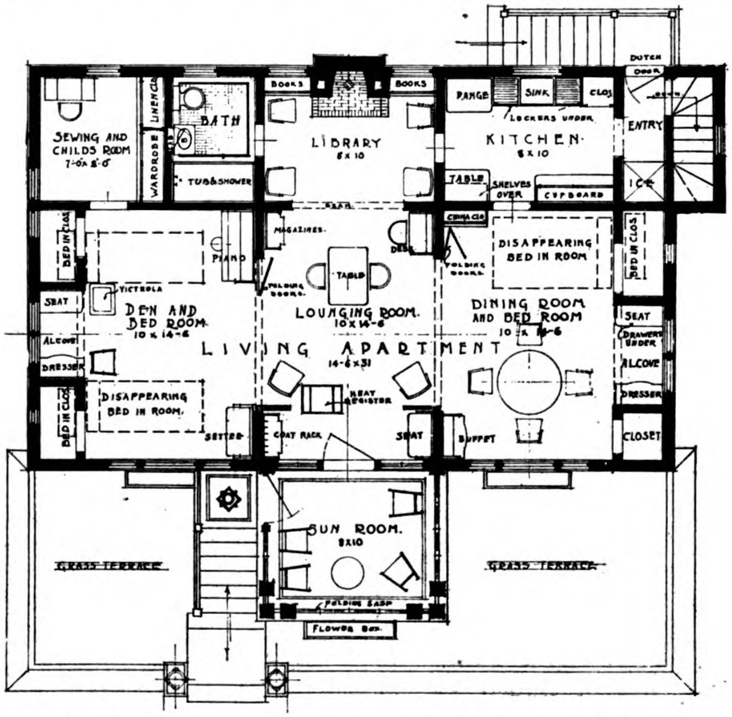
LIBERTY Apartment Cottage—A new type of dwelling, having six rooms in one, that eliminates all waste in planning, reduces housework, makes for efficiency in housekeeping, cuts the coal bill in two, provides healthier living quarters and defeats the high cost of building of to-day.

The war has been the cause of many changes taking place, both in our home life and surroundings. Economy and conservation is being practiced to-day in every patriotic home as never before. A tendency towards simple living is beginning to be felt throughout the country, due in a large measure to the war emergency and its effect will soon be noted in homes and dwellings as well as in our population.

We are spoken of as a nation of extravagance; prosperity and abundance having favored us. This extravagance has been marked even in the planning of our small houses with their large halls, staircases, monumental entrances, large kitchens that lack the conveniences of a good working arrangement, as well as the number of rooms (many of which are being used only as a place to receive an occasional visitor) and the bedrooms which serve only as a place to spend in oblivious slumber; dining-rooms that are in use about one hour and a half each day, and in many small families stand idle all day as meals are served in the kitchen. This extravagance is further enhanced by porches that are used only about three months and darken the rooms of the house twelve months of the year; unsanitary, dark and poorly ventilated basements that are unfit as a place for doing the laundry work, or for any other use, except for heating apparatus and fuel storage; spacious front entrances that are used by an occasional visitor or pedlar when often the members of the family constantly use the kitchen entrance; stair halls that create drafts through the house, keeping the tenant worried about the large coal bills to heat same; vestibules that darken the entrance hall, causing waste in lighting; waste attic rooms; bedrooms having no cross ventilation or air space between roof, making them sleepless in summer as well as heatless in winter; large unsanitary base-boards, door and window casings that act largely as dirt catchers and a waste of lumber. These are a few of the many extravagances, defects and wastes caused thereby, found in the average small house of to-day.

Many of these houses have not only been planned wastefully and badly, but are actually an inconvenience to good housekeeping and comforts of living.

With the heavy increase in cost of labor and building material, every square foot of floor area must be utilized if the cost is to be kept down. This economy in floor area and material must go on even after the war, as our forests especially will be almost depleted from the heavy demands made upon them for warfare material. It is also the consensus of opinion among the builders and material men that high prices in building are here to stay, unless the dollar is re-



Plan A Shows How a Floor Plan May Be Worked Out So That the Utmost Economy of Space Will Be Secured

proper fulfilling of the separate functions of living and bedroom, for the nature of these two rooms is such that when one of them is occupied the other is empty. The economy of combining the rooms is obvious.

Disappearing beds have been used with great success in apartment houses throughout the country. They are most practical and can be operated by a child. With the beds placed in the closets and the folding doors drawn back, a most pleasant and roomy living apartment is obtained. A feeling of both "Liberty and Democracy" is here to be sensed in place of the small stuffy rooms we have lived in, making for a healthier living condition. Ventilation, light and sunshine abound here on all four sides, and the entire room faces the front of the house. Much more wall space is also derived for furniture by this scheme than could be obtained from the ordinary large room.

A dressing alcove is provided at the ends with space for dressers, placed for an abundance of light, and seats having drawers underneath. A beam spans the opening, which can be decorated effectively with drapery should there be objection to showing a dresser in a living-room.

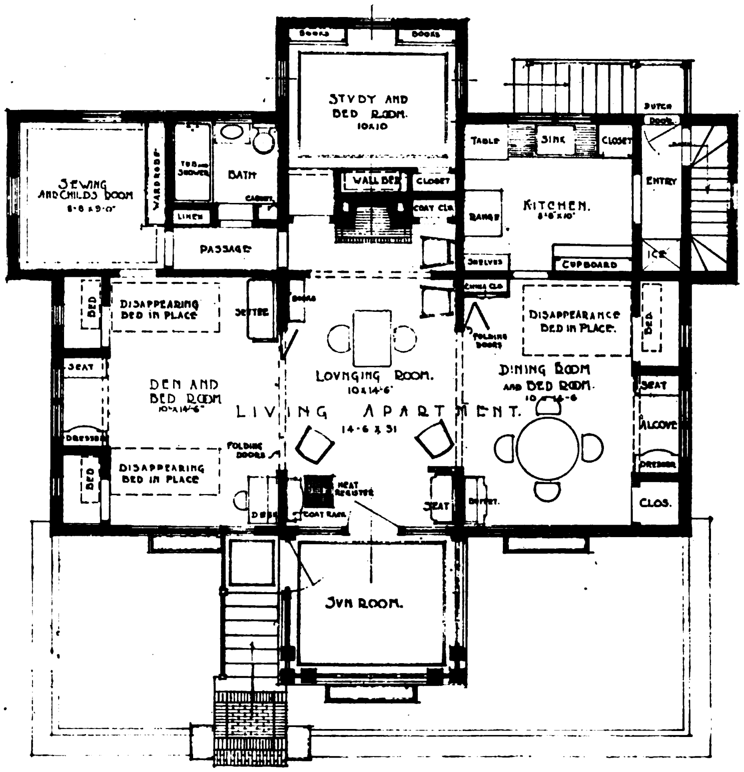
Ample closet space has been provided. Space in closets behind the bed is also serviceable. A window in the closet ventilates the bedding when shut in, giving it more airing than with the common arrangement where bed is on exhibition in the day.

The west end of living apartment may be closed off as a den at day time or when not used as a bedroom. Space is provided for piano, victrola, couch and chairs which in no way affect the sleeping-room arrangements.

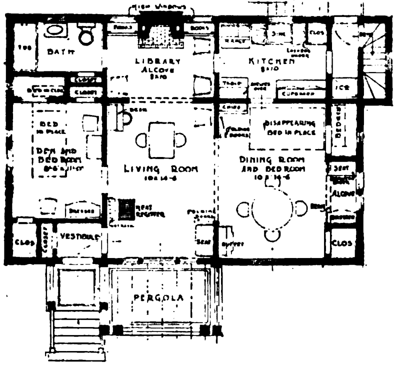
Folding doors between the rooms may be effectively treated with opaque glass and drapery, or leaded glass in top panel.

The center of living apartment is used as a lounging-room and contains space for hat rack and seat at entrance, also space for arm chairs, a table, desk and stand for magazines and newspapers.

Separated from the lounging-room by a beam the height of the folding doors, we have the library alcove with fireplace, bookcases four feet high, and windows above giving ample light to center of living apartment.



Plan C Shows Another Arrangement



Plan D Gives Another Possible Economical Arrangement

A sewing-room has been provided containing closets for family wardrobe and linen. This room may also be used as a smoking-room or child's room.

Bathroom is entered from a passage convenient for all bedrooms, is planned for a built-in tub, fitted with shower bath. A cabinet is provided for medicine and towels, having also a soiled clothes drop into laundry below.

In the small house where one does one's own work, added steps, inconveniences in getting at cooking utensils and material, and waste of space should be avoided. A small kitchen properly arranged with cupboards on the walls and a short run between, is not only an economy in building, but a most desirable arrangement for the housekeeper. Proper working arrangement of the kitchen converts the drudgery of daily routine into a pleasure.

We may realize the wastefulness of the ordinary kitchen arrangement when we consider the number of travelers served with meals from a kitchen dining car.

The kitchen is also reached from the alcove as well as the dining-room, permitting entrance to kitchen when dining-room is used as a bedroom without disturbing its occupants. When the den or dining-room is used as a bedroom for a sick person, lounging-room becomes a dining-room.

Closets for stores, brooms, etc., are included in the layout together with cupboards, sinks, space for range, table with shelves over same, and space for ice box in entry. A dutch door which allows the upper to open while the lower half remains closed provides a cross draft for kitchen.

The one chimney is placed so that it furnishes flues for the kitchen range in addition to the fireplace and heater in the basement.

Small sanitary base-boards and casings are used throughout, avoiding dust holders as well as saving on the material.

The house is heated with a "Pipeless" furnace, which responds instantly and is considered the most efficient and economical of heating installations for small buildings of open plan like this. Burns any fuel and delivers all its heat. Humidifies the air by evaporating an ample quantity of water. The heat comes up through the center of a large register, the cold air returns through the ends of same register. It operates without the dust of the ordinary furnace and has arrangement for warming a separate room. With fireplace flue at other end of room, a most perfect heating and ventilating system is obtained.

A saving of a large quantity of coal can be effected annually by this type of plan together with this heating system.

While the amount of fuel required depends considerably upon the skill of the fireman, this type of dwelling can be comfortably heated for eastern climate on 4 to 5 tons of hard coal or its equivalent of other fuel, as against 6 to 9 tons required for the average small dwelling of the old type plan.

It also saves the floor area taken up by

stored to its former buying power as before the war.

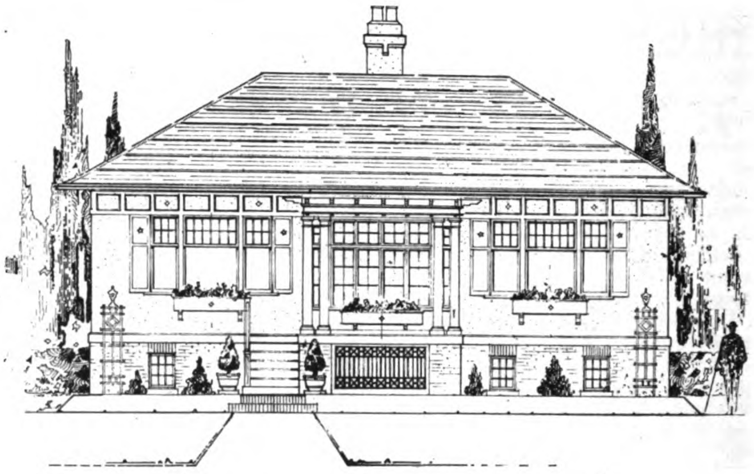
Under these conditions and with a desire to conserve and avoid all waste in building as well as in food, we are to-day confronted with the serious problem of providing small houses for the wage-earner and family of moderate incomes. Quoting the words of our late President Cleveland: "It is a condition we confront, not a theory."

The requirements of the "small house family" are somewhat different from those of larger establishments. The introduction of elements which are most convenient in the larger house into the former problem, often leads to waste and actual inconvenience.

The key-note of the small house should be simplicity and this should extend to both plan and facade. Many small separate rooms is an arrangement no longer necessary. The old trouble of heating and housekeeping, which made it easier to keep one room in order for the occasional guest, has long been relegated to the past. We are recognized as a very democratic people and live too close to each other in these days to make us wish to have a special spot for visitors.

"Democracy," the very thing for which we are fighting, should be our by-word in planning our homes. This atmosphere can be obtained for the small house and still maintain privacy when needed.

With this new type of plan here shown, one may enjoy more comfort and healthier living quarters than with the old type of house plan and with the immense economy derived from this plan many can now realize their hopes to own their home.



Front Elevation of the Cottage

The floor plan of dwelling (plan B here shown) contains eight livable rooms in an area of 24' x 37' including two bedrooms, dining-room, den, lounging room, library, sun room, sewing-room, bathroom and kitchen, requiring the work and attention of less than half that number, thereby making a few "workless days" every week for the over-worked housekeeper.

Many steps are also saved in going up and down stairs, answering bells and calls, as in the two-story abode. It solves the servant problem by the elimination of unnecessary work as required in the average household of means where help is employed to keep rooms in order and dusted.

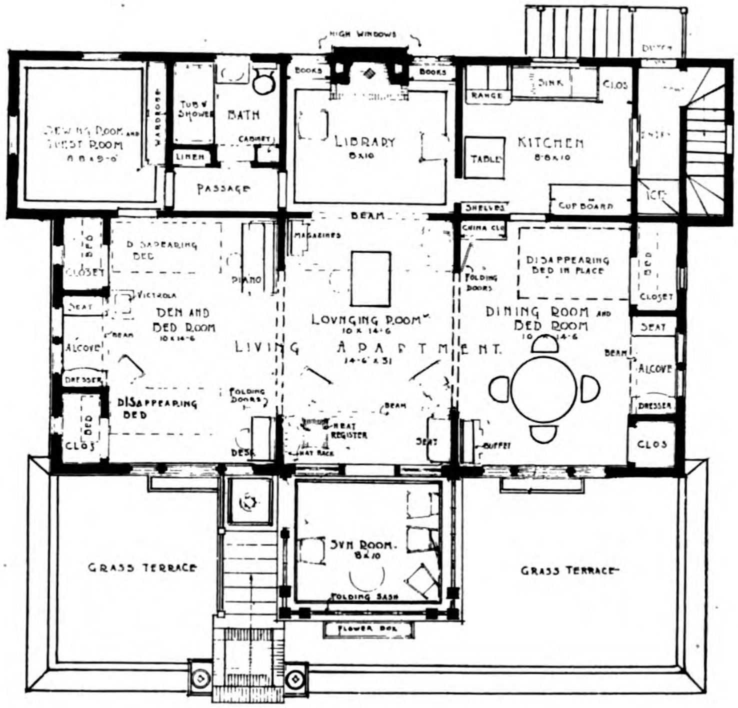
Furniture investment is greatly reduced as well as saving in freight and cartage when moving.

On entering the house here shown, the steps have been placed to the side of the sun room or porch, in place of the conventional center entrance. It can be seen at a glance to give a more serviceable porch and to avoid disturbing the occupants by the one entering the house. By enclosing this porch with folding glazed sash, it becomes useful in the winter months as a vestibule as well as a sun and sleeping porch in summer.

The entrance doors and side lights to lounging-room are glazed full length to the floor, giving ample light to the center.

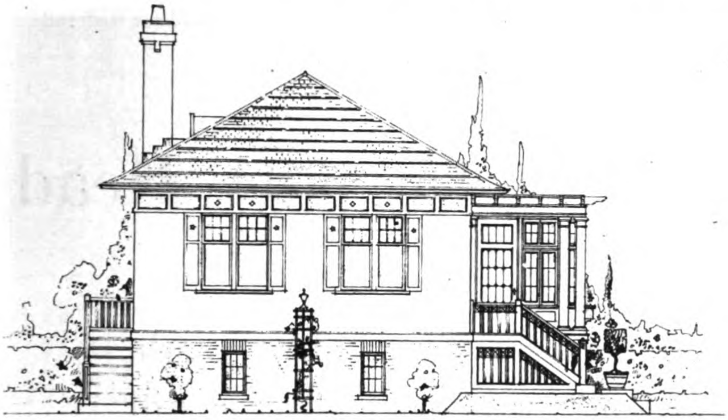
We now enter the six-in-one-room living apartment: With the use of a folding door arrangement and disappearing beds, a most feasible scheme is obtained that permits the use of the bedrooms at the ends of house for a dining-room and den, and causes no shifting of furniture or inconvenience in their daily use. This is a most practical arrangement, for where space must be conserved it seems an extravagance to have a room so little used as a dining-room. This arrangement permits closing off one or two of the end rooms from the lounging-room in cold weather. Another feature is the closing off of the library alcove use of these same doors, when one wishes seclusion and warmth from the fire hearth. By use of these doors a partition for vestibule at the entrance or a screen for seat or coat rack may be formed.

For social affairs, the whole living apartment can serve for dancing or card room arranged with tables which can afterwards be removed, making a fine big room for entertainment and dance. Thus one can entertain here on a larger scale than in a much bigger house, for no matter how small the family, there are times when, for social purposes, it is necessary to have a large room. Nor does this scheme interfere with the



Plan B Is a Possible Variation of Floor Plan

radiators for steam and hot water heating. While heat is very necessary in cold season, radiators are neither useful nor ornamental in summer and act as dirt catchers. The small house should not act as a storehouse for articles out of season or not in use, which take up valuable space.



Side Elevation of the Cottage

The ordinary house plan of to-day, with its many separate rooms, will not permit the use of "Pipeless" heater.

It is said home is not complete without a baby. If this is true, no home is complete without a proper place for the storing of the baby carriage. The height of sun porch floor above grade lends itself to the storing of this vehicle.

The flexibility of this plan readily permits the addition of one or more bedrooms without disturbing the living apartment at front.

The first requisite for a pleasing design is good proportions and lines. A house need not be elaborately decorated and cut up with many bays, dormers and motives to make it a house of character. Simplicity must prevail in the exterior design of the small house as well as in the plan. The square box shape of house is a good form to avoid. The success of the exterior design depends largely upon the form of the plan and its mass. Breadth of effect is by no means impossible in a small house, but the attempt to crowd into it all the features of a large mansion invariably ends in disaster, both to convenience and artistic effect. A few flower boxes and well-placed trellis will do much towards "dressing up" the exterior and at a small expense.

The design shown here can be executed in brick, stucco, or wood covering and retain the same character and pleasing lines.

The cottage and bungalow type has an objection to many for the reason of the first floor level being close to the ground, affording no protection for the sleeping rooms on the ground floor, and being too close to ground moisture and dampness. These buildings have been so placed often for effect, giving the house character and appearance of growing out of the ground, but at the expense of serving as practical homes in many cases.

This is overcome by elevating the floor level five to six feet above grade, which also prevents the rooms from acting as a show-case to passers-by in the street, as is frequently the case in the average house. This takes the cellar well up out of the ground and dampness, making it an ideal place for laundry, storage, etc., as well as a livable spot in hot weather. Cellar should have ceiling rough-plastered to prevent the dirt and cold coming up through the living-room floors and eliminating fire hazards.

Four similar floor plans are evolved from scheme "B" here shown, having 2, 3 and 4 sleeping rooms. Can be built complete for $2,500 to $3,600. Price will vary with the finish and quality of material used and location where built.

Building a Durable and Economical Balustrade

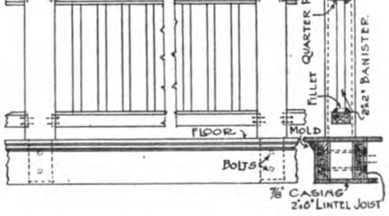
Especially Strong Construction Is Often Essential—This Article Points Out How It May Be Gained

By E. V. Laughlin

THE balustrade described in the following article affords protection along nearly 200 ft. of balcony in an auditorium-gymnasium constructed by me recently. The expense of construction was relatively so moderate that my architectural friends marvel when I point out the cost to them. Notwithstanding this fact the balustrade is handsome and durable. It has successfully withstood the surging of excited crowds of basket ball enthusiasts—a convincing evidence of its durability. In describing its details of structure I feel sure that I am recommending a pattern that will universally give satisfaction.

The relatively slight cost of the balustrade under description is traceable to the use of the less expensive materials and to simplicity of structure. Owing to the fact that only straight work was involved, one carpenter required scarcely two weeks to build the entire 200 ft. above referred to—something that would not have been possible had the pattern been at all complicated.

The posts that sustain the balustrade are 7 ft. apart. At the lower end they are bolted into the 2-in. x 8-in. lintel joists that carry the balcony floor, while at the top they fasten into the trusses that sustain the roof. These posts are 4-in. x 4-in. timbers, encased in ⅞-in. yellow pine finish. The latter was mitered around the central timbers, thus increasing the effect of solidity and heaviness. In the accompanying sketch the details of assembling are given. In order to make the whole arrangement clearer I have represented also the union of the posts with the lintel timbers beneath.



Elevation and Cross Section of a Strong Balustrade

By consulting this sketch it will be noticed that the rails are toenailed into the central timbers of the posts. This was accomplished before the yellow pine finish was put on. The effect is practically the same as if the nails had been mortised into the posts. For banisters the standard 2-in. x 2-in. material was

used. In addition to being nailed into the rails it was held in place by quarter round and fillet. The latter two add greatly to the appearance of the whole structure.

I debated for some time whether to extend the banisters clear to the floor or to employ a bottom rail. I am not sorry that I finally decided upon the latter, for it adds greatly to the convenience of sweeping and scrubbing.

An important feature of this balustrade yet remains to be pointed out. I refer to the truss strength that it furnishes. Knowing that the balcony would have to carry unusually large crowds I was anxious to furnish every possible safety. In studying the balustrade I saw that it might be made to furnish much carrying power. I directed my carpenter to crown the rails slightly at their middle portions. Being held firmly in this position by the banisters, the balustrade becomes a powerful ladder truss. It would be difficult for the posts to settle, gripped as they are on opposite sides by the banister tied rails.

A Concrete Silo for Twenty Head of Cattle

It Is a Money Maker for the Farmer—This Article Gives the Details of Construction and Material Bill

By Frank T. Fellner, Architect

SILOS have been constructed of different shapes and varying forms, but the round silo has proven the most practical, with the ensilage settling more firmly throughout, and no angles or corners to allow for air holes, or surfaces for the ensilage to cling.

The dimensions of silos are determined by the size of the herd to be cared for; the accompanying plans and details call for a structure to accommodate 20 head of cattle. The dimensions as to height and width can be varied to take care of a greater or smaller head of cattle. However, care should be taken in increasing the dimensions of the silo, for safety, and should a much larger structure be contemplated than the accompanying plans call for, the local civil engineer or material concerns should be consulted to determine the correct thickness of walls and reinforcing required, which will vary as the dimensions are increased.

Silos can be constructed of solid reinforced concrete, hollow tile blocks, hollow concrete blocks, reinforced with hoops running around continuously at joints.

Frame silos are constructed, but cannot be considered as among the best methods, and have the added disadvantage of not being fireproof.

Foundations

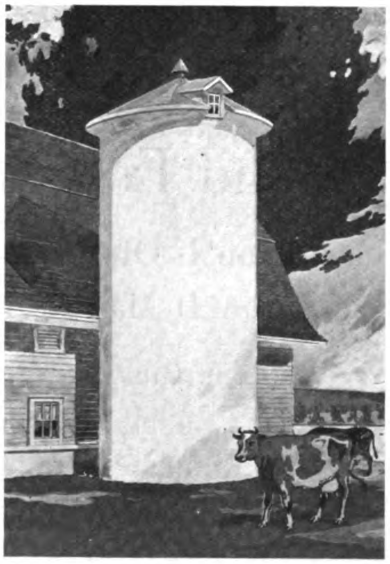
For a concrete silo, excavate down below frost line to a width sufficient to take in the footing course which extends 6" on both sides of main walls, which are 6" thick.

Concrete floor to be 4" thick and be continuous with top of footing course.

Provide drain in floor to carry away any excessive moisture.

Circular forms to be constructed of metal sheeting, built up on frame form, which is adjusted and carried up as the concrete is poured and the silo is being erected. Care must be taken to space the reinforcing rods as shown to take care of the pressure from within, when silo is filled.

Rods to run in both directions, and to be continuous, to form bands around the silo walls, set 2" from the outside surface and to form continuous uprights from top to bottom, spaced as shown.



This Concrete Silo Helps Bring Efficiency to the Farm

Openings are provided for emptying the silo, when need be, and wooden covers, fitting snugly on inside wall, keep the ensilage intact until needed.

The roof of the silo can be constructed by various methods—concrete, frame, or sheet metals, as would be found most convenient by the builder; if of frame, can be covered with shingles.

Should it be constructed of concrete, a roof of 4" thickness would be ample, reinforced with rods, as shown on the roof plan. Forms must be provided for this type of roof, and concrete must be poured in a thick consistency so it will lay up evenly.

A small dormer is provided in roof with window about 2' square, for filling the silo.

A roof of frame construction is easily erected by bolting plates to the top of walls and carrying studs up to the apex, sheathing with sheathing boards and covering with tin or corrugated sheet metal or shingles.

Concrete is composed of one part of Portland cement, two parts of clean, sharp sand and four parts of broken stone. Walls above footings are 6" thick. Footings project out on either side.

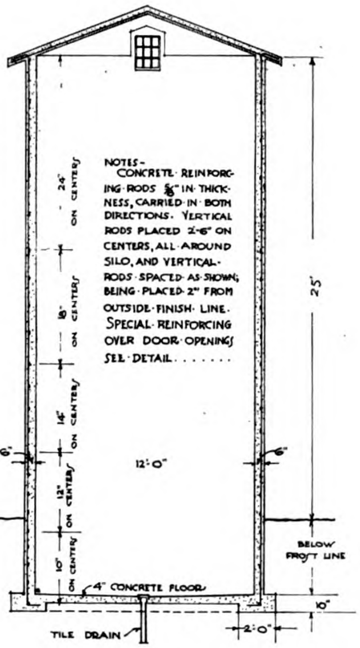
A chute should be provided where silo joins the barn, and to carry up to allow head room over the highest opening in silo. Chute can be constructed of concrete or frame, with a window at top for light and ventilation. A ladder is constructed and firmly fastened to silo, in the chute, to allow of access into the silo.

Estimate of Materials Required

Concrete (foundations, floor, walls, etc.)	45 cu. yds.
Roof (of concrete)	3 cu. yds.
Horizontal reinforcing rods	1400 lin. ft.
Vertical reinforcing rods	600 lin. ft.
Frame doors (2" stuff)	100 lin. ft.
Bolts	60 bolts
Wood forms (1" stuff, dressed one side)	2M. ft.

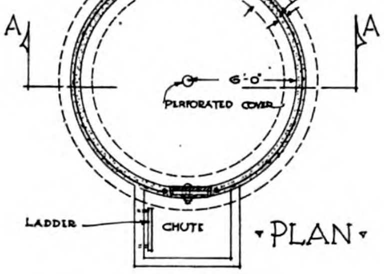
Should a frame roof be preferred, the following materials are necessary:

2" x 4" studs	300 lin. ft.
Sheathing boards	250 lin. ft.
Shingles	4 bundles

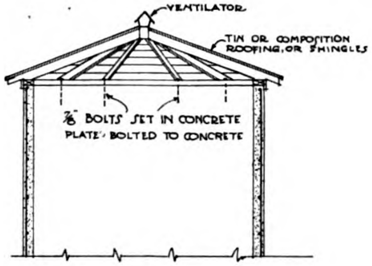


NOTES–
CONCRETE · REINFORCING · RODS ⅝" IN · THICKNESS, CARRIED · IN · BOTH DIRECTIONS. VERTICAL RODS PLACED 2'-6" ON CENTERS, ALL · AROUND SILO, AND VERTICAL · RODS · SPACED · AS · SHOWN; BEING · PLACED · 2" FROM OUTSIDE · FINISH · LINE. SPECIAL · REINFORCING OVER DOOR · OPENINGS SEE · DETAIL . . . . . .

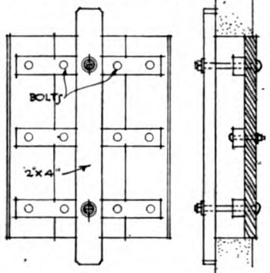
· SECTION · AA ·



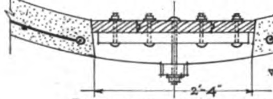
· PLAN ·



· SECTION · SHOWING · A FRAME · ROOF – SHOULD ONE BE · PREFERRED ·

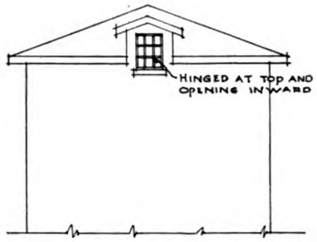


· ELEVATION · SECTION ·

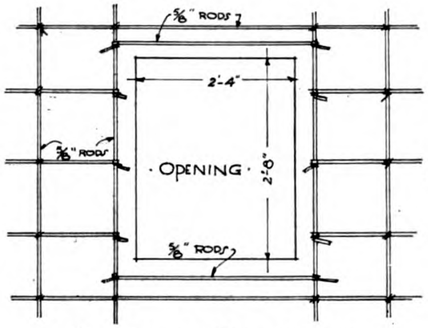


· PLAN ·

· DETAIL OF DOORS ·



· ELEVATION · OF LOADING · WINDOW ·

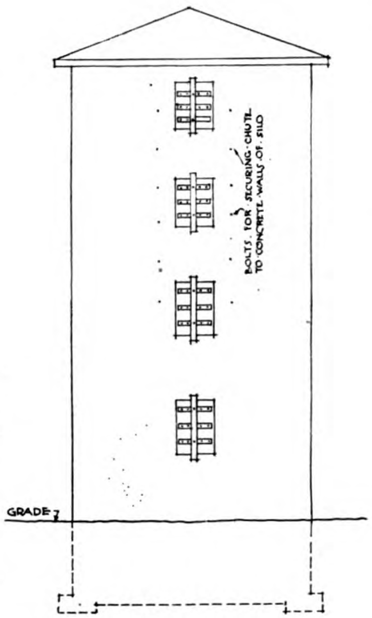


· METHOD · OF · REINFORCING AROUND · OPENINGS ·

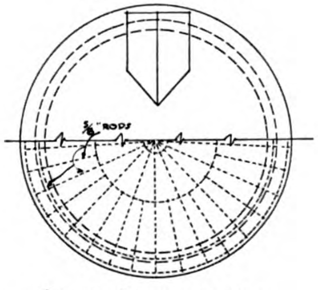
SCALE · FOR · PLANS · & · SECTIONS

SCALE · FOR DETAILS

· FRANK T. FELLNER . . . . . DESIGNER



ELEVATION · (SHOWING · DOORS)
· CHUTE · NOT · SHOWN ·



· ROOF · REINFORCING ·

MODERN · FIREPROOF · SILO, WITH · CAPACITY · FOR · FEEDING 20 · DAIRY · COWS

· THIS · SILO · HAS A HEIGHT OF 25 FEET ABOVE GRADE, WITH INTERIOR DIAMETER OF 12 FEET AND CAPACITY OF 65 TONS. THE DRAWINGS SHOW A SILO OF REINFORCED CONCRETE, BUT ONE CAN BE ERECTED OF EITHER HOLLOW TILE OR HOLLOW CONCRETE BLOCKS, REINFORCED WITH STEEL BANDS OR RODS SET IN GROOVES AT JOINTS – IF PREFERRED. A DETAIL IS SHOWN OF A FRAME ROOF, SHOULD IT BE MORE CONVENIENT TO CONSTRUCT IT OF THIS MATERIAL

MANUFACTURED OR HOME MADE PORTABLE FORMS OF SHEET METAL OR WOOD SHOULD BE CONSTRUCTED AND SET IN POSITION WHEN FLOOR HAS BEEN LAID, TO BE CARRIED UP AS THE WORK PROGRESSES. CARE MUST BE TAKEN TO IMBED REINFORCEMENT AS SHOWN. BOLTS TO BE SET IN CONCRETE FOR SECURING CHUTE TO SILO – CHUTE CAN BE CONSTRUCTED OF FRAME, FORMING ENCLOSURE FOR DOORS AND PROTECTION FROM WEATHER.

How to Build and Fireproof with Hollow Tile—III

The Treatment of Outside Walls Is Explained So That Economy May Be Effected and Time Saved.

By J. J. Cosgrove

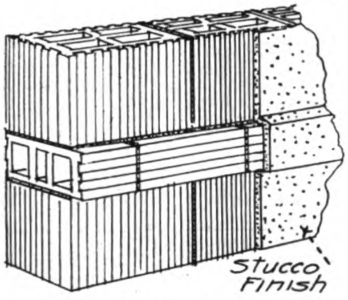


Fig. 18—*A Frequent Method of Laying Hollow Tile. This Method Is Incorrect Because the Tile Laid on Its Side Develops Only Part of Its Strength, and the Wall Is Thus Weakened. The Correct Method Is Shown in Fig.* 19

It would seem that but little of interest could be said about an ordinary wall of hollow tile; still, to the man who makes his living in the building trade, there is much to learn that will help him to keep his operations out of the loss column of the ledger.

One of the first considerations in designing or laying out a wall of hollow tile is to carefully space the window, door and other openings or breaks so that a certain number of tile with the necessary joints will just fill the space. This spacing of openings is not so necessary in any other type of construction; stone, concrete, brick or wood can easily be worked to fit any space. Hollow tile walls can be fitted out likewise, but it will affect a great saving in the cost of construction if all openings are so spaced as to avoid cutting.

Then, do not dump hollow tile from a wagon or truck, as bricks are dumped. Have them taken off and stacked each size by itself. This will save time in handling when ready to lay them in the walls, which will loom large in money saved at the end of the season. The saving in breakage, too, will more than pay for the cost of handling. The walls will present a better appearance when the tile are laid up than they would if corners and edges were chipped, and the improved appearance will add to the builder's reputation.

Chipped and broken tile are expensive to the builder in another way. The more cavities to be filled in a wall, the more mortar and plaster it will require, and the more time for the laborer and mason carrying and applying the mortar. Care in handling all building materials pays but more particularly in the case of hollow tile.

For the sake of appearance, and consequently reputation, do not patch out hollow tile with brick. Hollow tile are made in the proper shapes and sizes, and it is only necessary to select the stock best suited to your needs when ordering.

Neither is it necessary to break up a lot of hollow tile when small pieces are required. A certain percentage of fraction tile are shipped with each order, and if properly stacked on the premises can be delivered by the helper or tender as wanted. This will affect a considerable saving both in time and material.

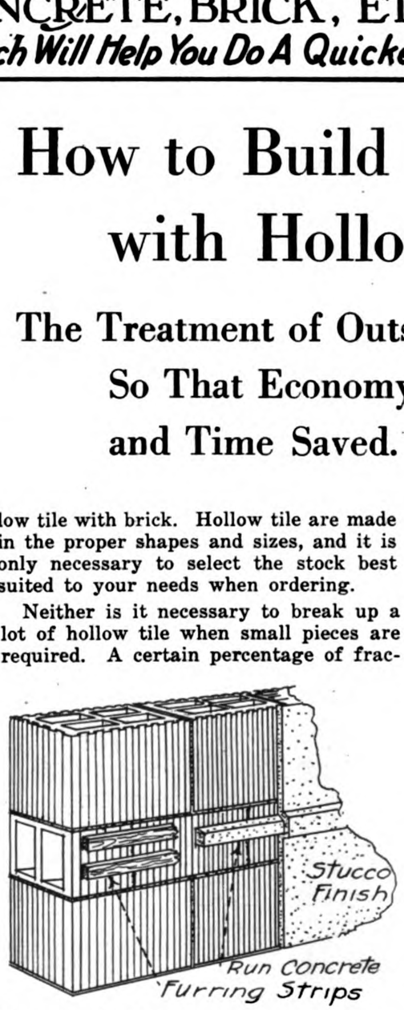


Fig. 19—*Building a Water Table on Hollow Tile. Two Furring Strips Are Fastened to the Wall, Acting as a Form. The Space Between Them Is Then Filled In With Mortar and the Strips Removed*

For architectural embellishment it is sometimes desirable to put a water table on the side of a wall built from the footings up of hollow tile. This is sometimes done as shown in Fig. 18, which is an incorrect method, and a little study of the work will show why it is incorrect. As stated in a previous installment, hollow tile when laid on side develops only from one-third to one-half the strength of the same blocks when set on ends. The strength of a hollow tile wall is, of course, no greater than that of the weakest course in the walls; so, if a bearing wall be laid with blocks on end, except one course which is laid on side, that one course will determine the bearing strength of the walls.

But when hollow tile are laid on side, the shells and webs are all in compression, as they come one above another. In the case of this incorrect method of water table construction, as can be seen by referring to the illustration, there is no web in the partition blocks used to form the water table, which will serve as a bearing for the outer shell of the tile. For this reason a wall with such a course would be weaker than a similar wall having one row of tile laid on side.

Notwithstanding that this is not considered good construction for ordinary building practice, this method may be used for one story buildings, particularly temporary buildings, where there is no load to bear other than the dead weight of walls, roof and snow or wind pressure on the roof. It is not recommended, however, and it is better not to adopt it in any practice.

The correct and approved method of running water table on hollow tile walls is shown in Fig. 19. This is simple, inexpensive and quickly run. All that is necessary is to nail two furring strips the proper distance apart, wedging them

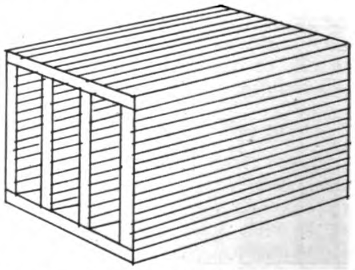


Fig. 20—*Hollow Tile Bed Plates for Floor Joists Are Shipped in This Form. They Are Later Broken Apart and Used as Shown in Fig.* 21

from the wall to form a perfectly straight line, then fill in the space between the furring strips with neat cement, mortar, or concrete. If preferred, when a more ornamental course is to be run, it can be applied as all solid plaster mouldings in the interior are run by using one furring strip for a straight edge, and a zinc template for a runner.

The mason cannot proceed far in the building of a hollow tile wall before provision must be made for the floor beams. This has been provided for in the manufacture of hollow tile, and he will find special blocks which greatly simplify this work, while at the same time preserving the bond.

In Fig. 20 can be seen a nest of one inch tile. They are not to be used this way, but are made up in this form simply for convenience in manufacturing and shipping. These nests are to be broken apart and the single slabs used for bearings under joists, sills, and for working up to story heights. All that is necessary to separate the nests up into single slabs is to tap on the corners of the nests.

The manner in which a hollow tile wall is prepared for a tier of beams is shown in Fig. 21. When the wall has been carried to the proper height, a layer of one inch slabs is laid along the wall to form a rest for the ends of the joists. Should the wall lack an inch of the required height, another course of slabs may be laid on top of the first one to elevate the joists that much. These slabs prevent at the same time the overturning tendency that would be present if the ends of the floor joists simply rested on the inside shell of the blocks. Stopping or closing the air cells at each floor, too, checks the tendency for air currents or drafs, thereby improving the insulating value of the wall against loss of heat.

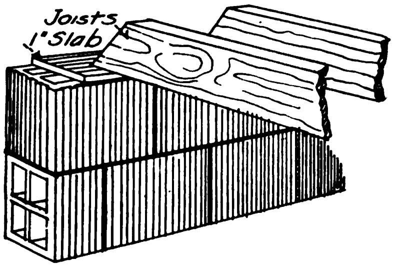


Fig. 21—In Preparing a Hollow Tile Wall for Floor Joists, Bed Plates or 1-in. Slabs Are Laid Along the Top of the Wall to Form a Bearing Surface. These Tiles Are Also Used to Build Wall Up to the Proper Floor Heights

It will have occurred to the builder by this time that at those levels where there are tiers of joists, the timbers would interfere with the laying of the hollow tile blocks, and his ingenuity will be taxed to find a way out of the problem. The problem is not so hard to solve, however, as it would seem, but before explaining how to fill in this course, a word of caution will not be amiss.

Do not, then, cut holes in the tile blocks in which to frame the joists. Remember that the strength of the walls will depend on the bearing of web and shell, and every hole in a tile block weakens the construction.

The correct way in which to lay the course of tile at the joist levels is shown in Fig. 22. At the outside of the wall a layer of blocks of sufficient thickness to reach in to the ends of the joists is laid; then between the joists and breaking joints with the outer course. These blocks are of sufficient thickness to finish flush with the inside of the wall.

It is important that a good mortar be used for laying a bearing wall of hollow tile. It is recommended by the manufacturers that all mortar used for laying up hollow tile consist of a standard Portland cement and clean sharp sand in the proportion of one part cement and three parts sand, well mixed to a smooth, moderately stiff mortar. If the mortar is not moderately stiff, most of it will fall off the web and shells into the cells; while if the mortar is too stiff, the blocks will not settle to the proper bed.

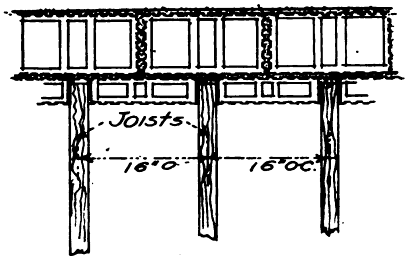


Fig. 22—Plan of Joists Framed Into Hollow Tile Wall. Two Sets of Tile Are Used, as Shown

As a rule it is not well to mix lime in any great amount with the mortar. A small amount not to exceed ten per cent is not only permissible, however, but makes the mortar more workable. At night, or quitting time, care should be taken to cover the tops of all unfinished walls to protect them against stormy weather.

At the top of bearing walls, roof sills are provided to which the roof rafters are nailed. These roof plates must be secured to the walls to prevent the roof from blowing off. In hollow tile construction the roof plates are bolted to the wall. Three quarter inch bolts twenty-four inches long are embedded in the two upper courses with cement grout at intervals of five feet. The bolts should extend six inches above the top of the wall, to allow the plates being fastened down with nuts.

(*To be Continued*)

Making a Concrete Cellar Wall Dry

Faulty Construction of Basement Wall Frequently Causes Dampness in the Cellar—This Article Shows How a Dry Cellar May Be Secured

By H. Colin Campbell

MANY builders have had more or less trouble when using concrete for basement or cellar walls. Frequently the cellar is damp due to porous concrete. This has unfortunately been frequent enough to lead many to think that concrete is undependable where watertightness or waterproofness is required. We forget that the term waterproof, like the term fireproof, is relative rather than absolute.

Concrete will probably withstand long exposure to fire better than any other building material. But that does not mean that it is adapted to building furnaces. The trouble with the general conception of the term waterproof is that permeability, absorption and dampproofness are confused. A mortar or concrete is impermeable (not necessarily dampproof) when it does not permit the passage or flow of water through its pores or voids. It is doubtful whether a concrete could be made that is utterly free from voids, but watertightness in concrete may be secured to a sufficient degree for all practical purposes by so proportioning properly graded materials that voids will be reduced to the lowest minimum and those existing will not be connected with one another forming continuous channels or passageways through the mass of the concrete.

The absorption of a mortar or concrete is the property it has of drawing water into its pores or voids by capillary action or otherwise. If voids between grains or particles and in the individual particles, as may happen in porous sand or

stone, are sufficiently large and are connected from surface to surface of the wall, the concrete will be permeable to water. If the pores or voids are very small and connect one with another, they may in theory act as capillary tubes, absorbing and drawing through and becoming filled with water; but in practice the capillary forces tend to hold the water in the pores and, unless the structure is opposed to pressure, will prevent the passage or flow of water, even though one surface of the structure may have to resist considerable hydrostatic pressure.

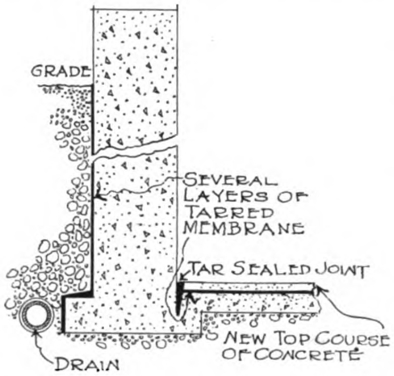


Fig. 1.—A leaky wall and floor may sometimes be repaired by digging down outside the wall, applying several layers of tar-coated burlap or canvas and laying a tile drain all around the foundation just below floor level, connecting this drain to some suitable outlet. The old concrete floor can be covered with several coats of hot tar and burlap and a new course of concrete 2 inches or more thick laid upon this. The joint between the floor and wall should, of course, be well sealed by caulking with tar-soaked oakum.

That concrete well made and properly placed is from one aspect a watertight material is proved by the fact that concrete is used for dams and other structures where water must be held back. There are many concrete tanks that have never leaked and that represent nothing but first-class concrete practice that are evidence of the truth of the foregoing statement.

Unfortunately on a great deal of concrete work we have the uncontrollable human element—the man who thinks that some one of the fundamental principles of concrete practice need not be observed; who thinks that disregard of that one will make no particular difference, when it is this disregard that is solely responsible for ultimate dissatisfaction. If mixtures are not properly proportioned; if the materials of which they are proportioned are not graded so that voids or air spaces are reduced to the lowest possible minimum; if mixtures are made too dry, so that they cannot be settled to utmost density in the forms; if they are made too wet, so that when placed there is a separation of materials; if after placing the concrete it is not protected against too rapid drying out, the work will not be watertight.

One is often deceived into thinking that moisture which appears on a concrete wall surface is due to leakage or the passage of water through the concrete, when in reality it is the result of condensation owing to differences in temperature between indoors and outdoors. This condensation is largely the result of poorly or unventilated quarters. Proper ventilation often cures the damp cellar or basement trouble. Of course, water sometimes passes through a concrete wall without any particular obstruction where precautions have not been taken to properly treat the planes where different day's work is stopped and the subsequent day's work started.

It is, of course, necessary that most uses of concrete in building construction shall result in work that is watertight or waterproof. Basement walls, floors and roofs fail in part of their intended usefulness unless such an end is attained. Reinforcing steel must also be prevented from rusting, and rust cannot be prevented unless rich, dense concrete everywhere encases the steel. The use of the proper amount of water necessary to produce a medium or mushy consistency is one of the most important conditions in securing watertight concrete, especially where the leaner mixtures are used. Dry mixtures cannot be sufficiently compacted in the forms, and owing to the little water used the concrete will not harden as it should.

No step or process in the making of watertight or impervious concrete is of more importance than the curing or hardening. Sun and wind rob the concrete of water, a most necessary material in the transformation of the cement to render effective its full binding and void filling capabilities. The more nearly all recognized fundamentals of good concrete practice are observed, the more nearly watertight or impermeable will be the resulting concrete.

However, there are many people who believe that concrete cannot be made watertight without resorting to some extraneous medium or method. The writer is convinced that concrete in itself can be made watertight for all practical purposes to which it is called into use to-day so that waterproofing of concrete need rarely, or never, be called for except in those cases where unsuitable material had to be used or where poor practice prevailed throughout. Then waterproofing resolves itself into an attempt to repair a defect built into the work.

There are three methods or systems employed to increase the watertightness of concrete. These are the integral, the superficial and the membrane methods. The first consists of adding something to the concrete when it is mixed or mixing the concrete materials in certain proportions so as to make the concrete watertight of itself. The superficial method consists of coating the concrete surface with some material or preparation that will adhere to it, remain attached and fill the surface pores. The membrane method consists of putting on the concrete a coating distinct and separate from it. This coating, if properly applied, will not necessarily crack off the concrete itself because it is a distinct and somewhat elastic membrane, usually strengthened by felt or other fiber cloth and filled with some asphaltic or bituminous material.

It is, of course, impossible to use the integral method after the structure has been finished. In integral as well as superficial methods, a crack in the concrete would make the best waterproofing medium or method of no avail. When melted paraffin is applied to a concrete surface with a brush, as is sometimes done to increase watertightness, the treatment belongs to the superficial method. So does the method which involves the application of sodium silicate solutions or the Sylvester process. The first consists of dissolving sodium silicate, or water glass, in water and painting the concrete surface until the pores will take up no more. A chemical change takes place between the sodium silicate and the free alkalis in the concrete, resulting in an insoluble compound that fills the pores and prevents the passage of water. There are paints which are used in a similar way.

The Sylvester method consists in applying hot alternate solutions of soap and alum. Without going into a discussion of the merits of various waterproofing mediums or compounds it may be safely said that their use should be discouraged for one particular reason if for no other, namely, the use of compounds or treatments invites the man on the job to slight his workmanship and to think that the addition of one of these preparations, or that the final application of some treatment, will compensate for lack of cement in the mixture, poor grading of the aggregates or disregard of other requirements that should have been fulfilled.

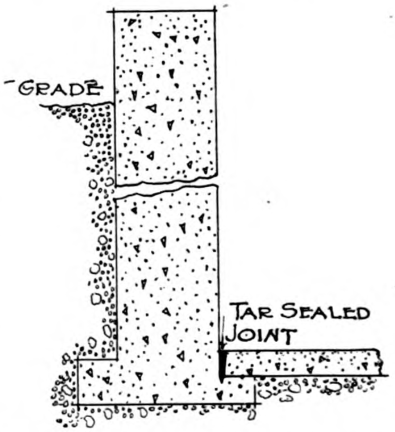


Fig. 2.—This sketch shows the method of caulking the joint between floor and wall when leaks are due to open joint there.

Some of the so-called waterproofing compounds are void fillers; some are

chemical preparations that react with free chemicals in the cement and produce insoluble compounds in the concrete. Hydrated lime added in limited quantity to a concrete mixture will increase its watertightness, but hydrated lime is an inert material and acts as a void filler. A little more cement would accomplish the same end with equal certainty and at the same time without any liability of weakening the concrete, as will happen if an excess of hydrated lime is used.

After a basement or cellar wall has been finished and leaks appear, repair methods are naturally limited. Asphalt or coal tar is used for waterproofing, applied hot with a mop. It must, of course, be applied to the outside wall surface, that is, against the face from which the pressure first comes. Tar or asphalt is very often used with a cloth fabric which constitutes the membrane treatment. The bituminous membrane is built up in place in successive layers and should form a practically continuous waterproof envelope.

Leaks sometimes occur due to rise of ground water level, as after a protracted rainy spell. In such cases the leak usually shows itself where basement wall and concrete floor join. A leak of this kind is difficult to stop but, unless the water pressure is great, it can be repaired by cleaning out the joint between wall and floor and caulking with tar soaked oakum.

When the water level in the ground is above the basement floor, a pressure equal to the head obtained by the difference in level of the water and the basement floor will be exerted. This pressure is greater than most builders realize even for a static head of only two or three feet. One cubic foot of water weighs 62½ pounds. If the basement floor is 2 feet below water level there will thus be exerted an upward pressure of 125 pounds on every square foot of floor area. If the concrete is not dense this pressure will force the water through it. If it does not do that, it may either lift the floor or if the floor is not thick enough, may crack it. This is an unusual difficulty. If it occurs it is hard to combat.

Accompanying sketches show methods of joining wall and floor to prevent or to repair leaks. Minor modifications of these ideas are, of course, possible. The concrete cellar or basement wall is rarely finished at one operation of concreting and leaks sometimes result from failure to properly join successive days' work. In tank construction many contractors embed in the concrete last placed a strip of metal, allowing half of it to project above the concrete so that it will also be embedded in the concrete next placed. This strip, if painted with cement grout just before concreting is resumed, will most effectively seal a construction joint.

It is always well, where the lay of the land will permit, to put a line of drain tile just below, outside and all around the basement or cellar excavation, connecting this line to a suitable outlet so that if there is a tendency for the soil to become waterlogged, the drainage line will attract the water, carry it away and thus relieve the concrete from receiving its pressure and effort to pass through the wall or floor.

How to Design a Retaining Wall—II

Some Valuable Information That the Contractor Can Put into Immediate Practical Use

By L. Goodman, C.E.

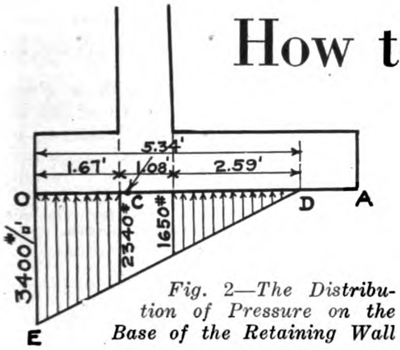


Fig. 2—The Distribution of Pressure on the Base of the Retaining Wall

IN designing or investigating a retaining wall, a section of wall 1 ft. long is taken and the design adopted for this foot length of wall is maintained throughout the length of the wall.

The diagram (Fig. 1) shows the assumed conditions for a reinforced concrete wall 12 ft. high above the ground and with a level top fill. The vertical wall is assumed to be 12 in. thick for a trial section; it is attached to the base at a distance of one-third the width of base from the outer toe. The width of base is taken at 0.4 of the total height of wall, which in the illustration is 6 ft. 6 in., and the thickness of base is assumed at 15 in.

The forces acting on the wall are the pressure from the earth P, the weight of the vertical stem W_1, the weight of the base W_2, and the weight of earth resting on the inner cantilever W_3. The earth on the outside of the vertical stem is neglected as it may not be put in place until some time after the wall is built and the wall should be safe without it.

For the case under consideration, that is, a horizontal top surface, the pressure against the wall, due to the earth, is, according to Rankine's formula for earth thrust:

$$P = \frac{wH^2}{2} \times \frac{1 - \sin\phi}{1 + \sin\phi}$$

in which w = weight of earth per cu. ft.

H = height of wall against which the earth acts.

ϕ = angle of repose of the earth.

With ϕ assumed at 35° and $w = 100$ we have

$$P = \frac{100H^2}{2} \times \frac{1 - 0.574}{1 + 0.574} = 13.5H^2$$

In other words for a level top surface the earth pressure against a vertical plane is equal to 13.5 times the square of the height on which the earth acts. The line of action of P is at a point 1/3 the height above the base.

The pressure of the earth tends to overturn the wall about the outer toe; this is resisted by the weight of the wall itself and the weight of the earth on the inner cantilever. Taking moments of all the forces about the outer toe of

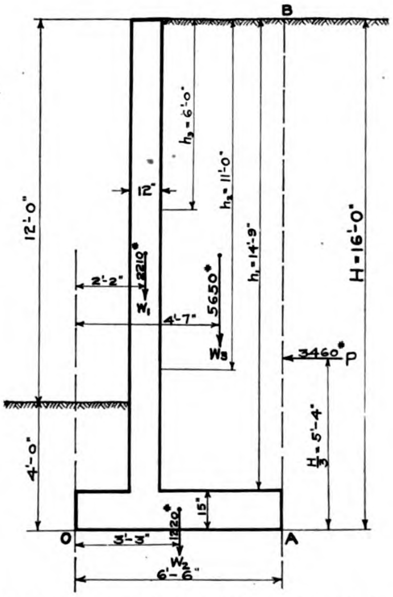


Fig. 1—Assumed Conditions for a Reinforced Concrete Retaining Wall, 12 ft. high

the wall the following table is readily computed:

TABLE A

	Weight W	Thrust P	Lever Arm	+ Moments	— Moments	Safety factor against overturning $=\frac{34,650}{18,450}=1.88$
	Pounds	Pounds	Feet	Foot-Pounds	Foot-Pounds	
$W_1=14.75\times1\times150$	2210	.....	2.17	4,800	......	
$W_2=6.5\times1.25\times150$	1220	.....	3.25	3,970	......	Safety factor against sliding $=\frac{0.5\times9080}{3460}=1.31$
$W_3=14.75\times3.83\times100$	5650	.....	4.58	25,880	......	
$P=13.5\times16^2$	.....	3460	5.33	......	18,450	
	9080	.....	....	34,650	18,450	

It is thus seen that the sum of the resisting moments is 34,650 ft.-lb. against an overturning moment of 18,450 ft.-lb. so that the wall has a safety factor against overturning of 1.88. A safety factor of from 1.5 to 2.0 is considered safe.

The pressure of the earth also tends to push or slide the wall along on its base. This tendency to slide is resisted by the friction of the concrete on the earth along the base of the wall. Taking the coefficient of friction of concrete on earth at 0.5, which is an average value, we have the force resisting the horizontal thrust as

$$0.5 \times \Sigma w \text{ or } 0.5 \times 9080 = 4540 \text{ lb.}$$

Therefore the safety factor against sliding is $4540 \div 3460 = 1.31$. A safety factor greater than 1 is considered safe as the cohesion of the earth along the line AB would have to be overcome before the wall would slide. Should the safety factor be less than 1 a toe wall should be used, extending down below the bottom of the wall, either at the front or under the vertical stem.

The maximum pressure on the earth under the wall can now be investigated. If there were no horizontal force acting on the wall, the sum of the weight W_1, W_2 and W_3 could safely be considered as uniformly distributed over the base of wall and the average pressure obtained by dividing the total weight by the area of base.

Due to the horizontal thrust, however, the weight is not uniformly distributed but some of the weight is transferred toward the outer toe. The distribution of pressure on the base is shown in Fig. 2.

To obtain this distribution the point C at which the resultant of the vertical and horizontal forces cuts the base is first obtained as follows:

$$OC = \frac{\Sigma(+M) - \Sigma(-M)}{\Sigma w} = \frac{34650 - 18450}{9080} = 1.78'$$

This is outside of the middle third of the base and the total weight of 9080 lb. is spread over a width of base equal to three times OC or $OD = 3 \times 1.78 = 5.34'$.

The average pressure on the portion of the base OD (DA does not have any downward force on it) is therefore $9080 \div 5.34 = 1700$ lb. per sq. ft. and as the pressure varies from zero at D to a maximum at O, this maximum pressure is equal to twice the average pressure on OD or 3400 lb. per sq. ft. Considering our soil good for a bearing value of 2 tons per sq. ft. the maximum pressure on the footing is within the allowable limit.

Should the safety factor against overturning or sliding, or should the maximum pressure in the base exceed the bearing value of the soil, the base would have to be increased in width until the above values were within the allowable limits.

Having investigated the stability of the trial section of the wall, the details of the vertical wall and then the inner and outer cantilevers can be designed.

Vertical Stem.

The earth pressure against the vertical stem is $P_1 = 13.5\, h_1^2 = 13.5 \times 14.75^2 = 2940\#$ and as it acts at a height of one-third h_1 above the footing the bending moment at the base of the vertical stem is

$$M_1 = P_1 \times \frac{h}{3} = \frac{2940 \times 14.75}{3} = 14460' \text{ lb.}$$

We now have a beam with a given bending moment and a width of 12 in. to find depth of beam (thickness of wall) and amount of steel required. From the standard notation* recom-

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*For table giving values and formulæ see any text book on Reinforced Concrete.

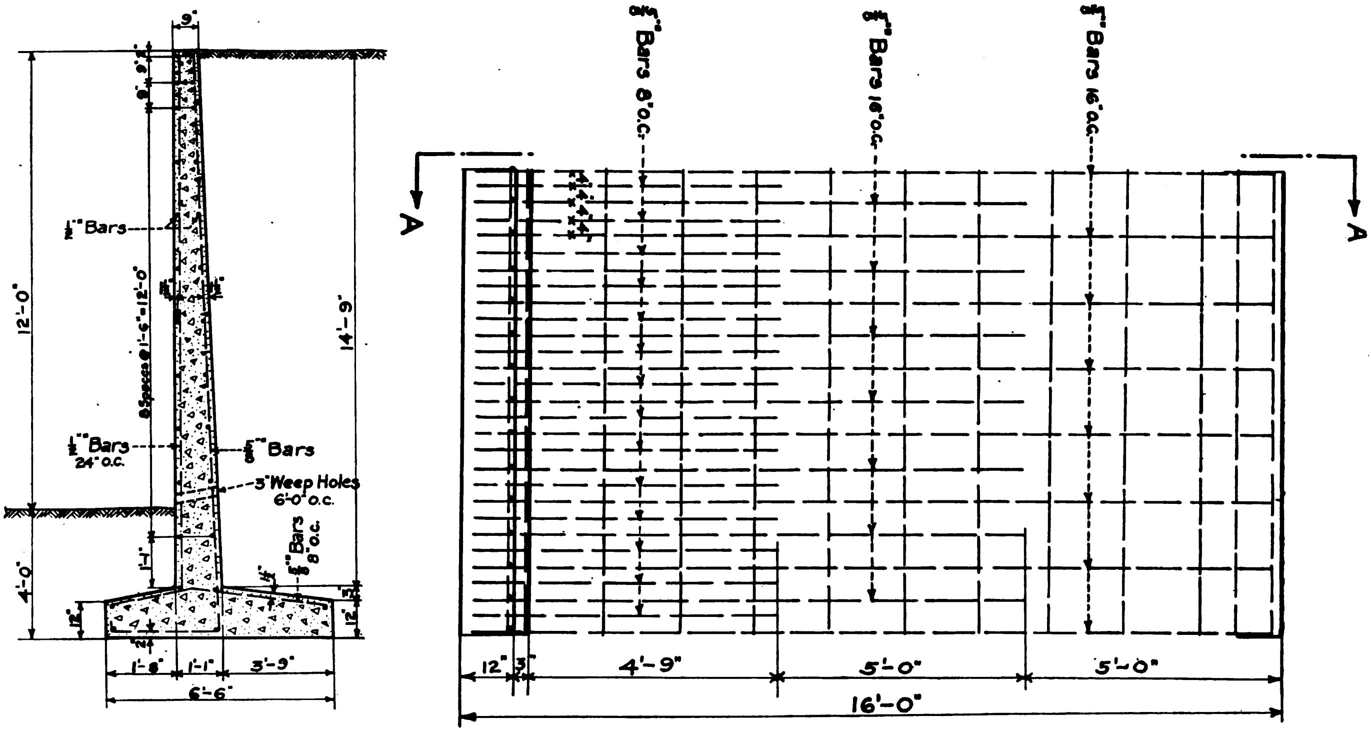


Fig. 3—Section on AA and Elevation of Retaining Wall, Illustrating Size and Placing of Reinforcing Bars

mended by the Joint Committee on Concrete and Reinforced Concrete and working values of $f_s = 16{,}000$; $f_c = 650$ and $n = 15$ we have the cross sectional formula.

$b\,d^2 = \frac{M}{K}$ in which for our case $b = 12''$ and $K = 107.4$.

$$\therefore d = \sqrt{\frac{14460 \times 12}{12 \times 107.4}} = 11.6''$$

and allowing 1.5″ protection for the steel gives a thickness at the base of 13 in. The area of steel required is

$$A_s = \frac{M}{f_s jd} = \frac{14460 \times 12}{16000 \times 0.874 \times 11.5} = 1.08$$

Use ⅝-in. square bars spaced 4 in. center to center, giving a steel area of 1.17 sq. in., which is sufficient. This steel is placed on the inside or rear face of wall as this is the side in tension.

Theoretically we would not require any thickness at the top of the wall as the earth pressure at that point zero, but for practical purposes and to resist frost action we will adopt a minimum thickness of 9 in. at the top.

As the pressure and the bending moment decrease toward the top of the wall it can readily be seen that some of the steel rods can be omitted before the top of the wall is reached.

Investigating a section 11 ft. from top of wall we have

$$P_2 = 13.5 \times h_2^2 = 13.5 \times 11^2 = 1630\#$$

$$M = \frac{1630 \times h_2}{3} = \frac{1630 \times 11}{3} = 5980 \text{ ft.-lb.}$$

Transforming the formula $bd^2 = \frac{M}{K}$ we obtain

$$K = \frac{M}{bd^2} = \frac{5970 \times 12}{12 \times 10.5^2} = 54$$

From a table of constants we find

$$p = .0038$$

$$A_s = .0038 \times 10.5 \times 12 = 0.48 \text{ sq. in.}$$

We will stop every other bar 1 ft. above this point to provide for embedment at end of bar and we will have steel area of 0.59 sq. in., which is ample.

In a similar manner a section about one-third of the way down from the top should be investigated and it will be seen that we can readily stop the bars as shown on the drawing, Fig. 3.

The section at the base of the vertical stem should be investigated for shear and also for bond stress on the bars.

The total shear $V = P_1 = 2940$ lb. per lin. ft.

$$\text{Unit shear } v = \frac{V}{bjd} = \frac{2940}{12 \times 0.874 \times 11.5}$$

$= 25$ lb. per square inch.

This is within the allowable value of 40 lb. per square inch for concrete without web reinforcement.

The bond stress on the bars

$$u = \frac{V}{\Sigma ojd} = \frac{2940}{3 \times 2.5 \times .874 \times 11.5}$$

$= 39$ lb. per square inch, which is within the allowable value of 80 lb. per square inch for plain bars and 100 lb. per square inch for deformed bars.

The embedment required to prevent the vertical bars from being pulled out of the footing is found by dividing the stress in a bar, by the perimeter of the bar times the allowable bond stress; for our case

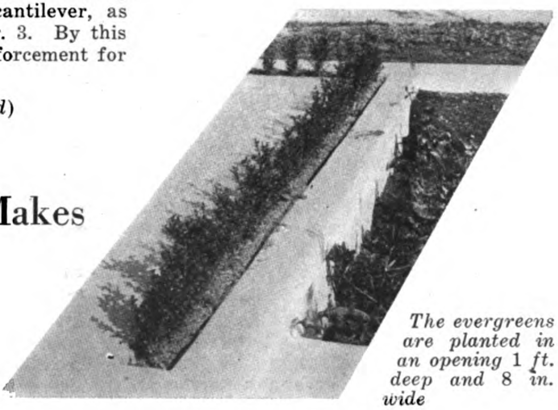
$$\text{the embedment} = \frac{.39 \times 16000}{2.5 \times 100} = 25 \text{ in.}$$

The usual method of providing this embedment of the vertical bars is to carry them down into the footing and bending them out into the outer cantilever, as shown on the drawing, Fig. 3. By this means we also provide reinforcement for the outer cantilever.

(To be concluded)

Novel Feature Makes Front Porch Attractive

By Albert Marple



The evergreens are planted in an opening 1 ft. deep and 8 in. wide

AROUND the edge of this concrete porch floor an opening about a foot in depth and 8 in. in width was left during construction work. When the porch was finished this opening was filled with earth, and in this small evergreen plants were placed. These have grown until they are now about a foot in height and serve very efficiently as a "different" railing for the porch.

As a drainage for this greenery or flower holder steel pipes have been run from the bottom of the opening through the concrete of the porch to the earth beneath. These pipes are located a couple of feet apart so that they may drain the entire "bed" in a satisfactory manner.

By eliminating the necessity of the construction of a railing around this porch, this feature, in addition to being a novelty in itself, really cuts down in the cost of the construction of the porch.

How a House Can Be Made Rat-Proof

Rodents May Be Excluded from Dwelling Houses at Slight Expense

IN constructing dwelling houses the additional cost of making the foundations rat-proof is slight, compared with the advantages, says a recent Farmers' Bulletin of the United States Department of Agriculture, "House Rats and Mice." The cellar walls, says the bulletin, should have concrete footings, and the walls themselves should be laid in cement mortar. The cellar floor should be of medium rather than lean concrete. Even old cellars may be made rat-proof at comparatively small expense. Rat holes may be permanently closed with a mixture of cement, sand and broken glass, or sharp bits of crockery or stone.

On a foundation like the one described above, the walls of a wooden dwelling also may be made rat-proof. The space between the sheathing and lath, to the height of about a foot, should be filled with concrete. Rats cannot then gain access to the walls, and can enter the dwelling only through doors or windows. Screening all basement and cellar windows with wire netting is a most necessary precaution.

In both city and country wooden floors of sidewalks, areas and porches are commonly laid upon timbers resting on the ground. Under such floors rats have a safe retreat from nearly all enemies. The condition can be remedied in towns by municipal action requiring that these floors be replaced by others made of cement. Areas or walks made of brick are often undermined by rats and may become as objectionable as those of wood. Wooden floors of porches should always be well above the ground.

How to Get Good Results When Coating Concrete with Cement

By A. M. Wolf, C. E.

IN any locality where the winters are cold with consequent great changes in temperature, the practice of plastering concrete surfaces with cement mortar to remove form marks and smooth up the roughened surfaces left by the forms, has, as a general rule, never proven satisfactory. The variations in temperature, aided and abetted by variations of moisture in the coating, soon play havoc with plastered concrete surfaces. Examples of the poor results to be obtained by plastering and brush coating can be found in almost every locality. Bridges, buildings, walls and abutments so treated may be satisfactory for a time, but in most cases, after about a year, they present a very patchy and spotty appearance, due to the flaking off of the mortar.

The only way that cement mortar can be made to stick on a concrete surface is to prepare it especially for such treatment by casting it with a corrugated surface or by roughening the entire surface after the forms are removed. The cost of such treatment will, in many cases, be much more than some of the better finishes that might be mentioned, and it therefore does not pay to prepare surfaces for plastering, since even then it cannot be depended upon to result in a first class job.

In general, the surface of any concrete work which is mixed wet is coated with a thin film of cement which produces a relatively smooth surface, not considering the lips caused by irregularities of the forms, to which it is difficult to make a mortar coating or wash stick.

It is a well known fact that a rich mortar, such as is generally used for this work, shrinks much more during the process of hardening in air and expands more rapidly, due to rises in temperature, than the concrete upon which it is plastered.

Prof. Alfred H. White of the University of Michigan found by experiment that 1:3 mortars contract from 0.08 to 0.1 per cent, which is, roughly, 1½ times the contraction of 1:2:4 concrete hardening in air as determined from tests in the Office of Public Roads, Department of Agriculture. This difference in contraction of cement plaster and concrete explains the cracking and chipping off of plastered concrete surfaces. If the mortar does stick for a time, it gradually loses its grip, due to the shrinkage of the mortar while hardening, coupled with the effect of the difference of the coefficients of linear expansion of the mortar and concrete due to temperature changes.

After the cement plaster coat has become cracked and separated slightly from the concrete, water easily finds its way behind it, and, if present when freezing weather comes, the plaster will be forced off by the expansive force of the freezing water. Even when a mortar facing placed at the same time as the concrete is used cases arise where the difference in contraction between the facing and the backing causes cracking and spalling of the surface. The same is true of concrete surfaces coated with a cement wash applied with a brush.

Even when care is exercised by preparing the concrete surface for cement plaster by removing the surface film of cement and roughening it to provide a bond for plaster, the results are, in the majority of cases, unsatisfactory. Various preparations are advertised and sold which are said to give a positive bond between a concrete surface and a cement plaster coat, by applying it to the concrete surface before plastering. These, however, have not been used with any marked degree of success in work exposed to the air.

Cement plaster applied to surfaces which are always damp or under water gives satisfaction in nearly all cases. This is due to the fact that the expansion of the finish and the concrete, while hardening under water or in the presence of moisture, is relatively small as compared to the shrinkage when cured in air, and more nearly the same for both.

If a concrete surface, as left by the forms, must be finished in some manner for appearance sake, it can be said with truth that plastering or brush coating is simply "jumping from the frying pan into the fire." Plastered concrete surfaces have been tried and found wanting too often to warrant their specification for any job.

Several methods of surface finish which are more durable and vastly more satisfactory can be employed. The cheapest of these finishes is the one obtained by rubbing the surface of concrete with carborundum or cement bricks before the concrete has thoroughly hardened. The cost of finishing concrete surfaces in this manner ranges from 1½ to 3 cents per square foot, depending on the nature of the work, i, e., whether plain or broken up by reveals, panels and mouldings. The surface produced by rubbing is of a lighter color than the ordinary concrete surface, is more nearly impervious, does away with form marks, and, in fact, is the ideal method of low cost finish for concrete work.

A most excellent finish was obtained on the concrete work of a boulevard bridge in Chicago by rubbing with carborundum blocks. The surface was obtained as follows: After the forms had been removed and the concrete had seasoned and dried out for a few days, the lips and ridges in the concrete, due to irregularities in the forms, were chipped or filed off with chisel, coarse file or rasp. The surface was then wet and rubbed with a coarse carborundum brick until the surface was fairly smooth. After this, a thin wash of cement and sand was applied and left to dry. The final rubbing was then done with a fine carborundum brick until all the cement wash had disappeared and the surface was as smooth as possible.

Bush-hammering, sand-blasting and acid-washing are used to a considerable extent, but these methods of finishing are too costly for use on the ordinary concrete structure, and are limited to use on the finer class of concrete structures, where beauty is the primary, and cost the secondary, consideration.

Save Money by Utilizing Waste in Concrete—How to Do It

By Hee H. See

WE have been given the name, unjustly perhaps, of being the most wasteful nation on earth. I say unjustly, because, in the years preceding the war it was not so easy to tell what was waste and what was not. One can waste more than material, and it has been my experience, and no doubt the experience of many of my readers, to watch a dollar's worth of time being wasted to save a nickel's worth of material. In normal times, when it costs more to save a thing than the thing is worth, saving becomes a waste. The American contractor, with his high wage rate can afford, nay, is often compelled, to let material go to waste that the European contractor with

his lower wages could quite profitably save.

These are not normal times, however, and the matter of saving everything, time, material and energy, has been removed from the realm of personal expediency or inclination to that of national necessity and patriotic duty.

The observing executive, studying conservation, is in a position to see many things; some deplorable, some worth while and some strange and curious. Amongst the latter may be mentioned the man who is so extremely careful not to waste the smallest amount of neat cement, but who yet seems to think nothing of wasting several shovelfuls of it after it has been mixed with sand and gravel and made three times as costly or valuable.

Cement delivered on the job is worth exactly what you can get more cement delivered for. Cement that has been handled once, twice or more times must have the cost of handling added to that of the cement, and it is, or should be, worth that much extra. If you once get to thoroughly realize this, you will probably save a little money by avoiding unnecessary handling.

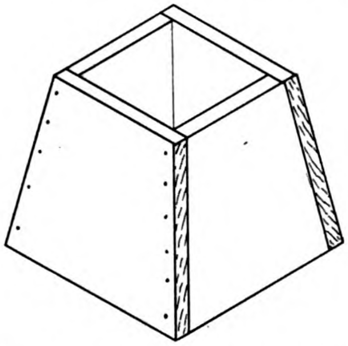


Fig. 2—Tapered Form for Footings

On small jobs, such as the concrete work on the average dwelling, one place where it is difficult to avoid waste is in the last batch needed to fill the form. The size of the batch is nearly always governed by the sack of cement; such as a one-sack batch, two-sack batch, etc., and no matter how much time is used up figuring on this last batch there will nearly always be some mixed concrete left over after the form is filled. This overplus is disposed of in various ways, according to the nature of the workmen. If there is only a small amount, some men will try to avoid wasting it by filling the forms heaping full; this practice usually results in a loss of time when we come to placing the woodwork. Others will simply throw the extra concrete into some convenient corner and forget about it. Forget about it until some days later, when they discover that a couple of small piers are needed for the back stairs, or an extra post is needed under the porch; then, while growling about the time wasted in setting up the mixing board, they remember the wasted concrete with painful regrets.

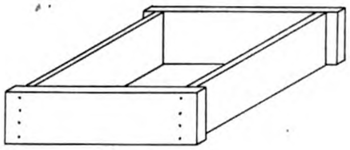


Fig. 1—A Form Used for Footings

To avoid these regrets the writer has evolved the following scheme: Forms are made of scrap lumber, 16 to 20 in. square and 6 in. deep, as shown in Fig. 1. These are filled with the extra concrete, and when thoroughly set are used for footings. No matter how many of them there are, they ar eusually all used up before the job is completed.

Tapered forms are also used, as shown in Fig. 2. These are made 12 in. square on the bottom, 8 in. square at the top and 12 in. high. They are best filled by turning them upside down. Fig. 3 shows the two footings used in combination, in which form they serve very well for interior piers.

If the mixing board can be left where it is without being in the way, the forms may be filled and left standing on it. Otherwise, they may be placed on a few scraps of board, or, in the case of the larger forms, merely on the level ground.

Those footings not used could be carried away at the close of the job, but this we have never done. As already stated, there are usually a number of places where they can be used to advantage, and if there are any left, we can nearly always make the owner feel happy by presenting them to him.

The flat footings are the more serviceable; they can be used to make a walk to the side gate, to make a splash stone or bucket stand under the lawn hydrant, to make a stand for the refrigerator in the basement, or in other ways that will readily occur to the one who has them to dispose of.

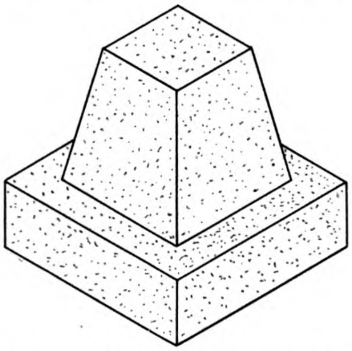


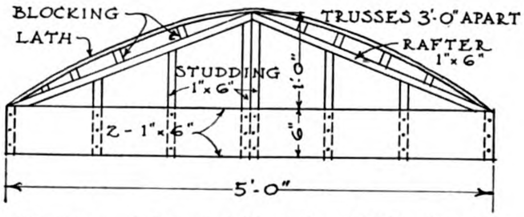
Fig. 3—The Results of Figs. 1 and 2 Used Together

A Simple Truss for Concrete or Brick Arches

By E. V. Laughlin

I HAVE used the truss described below very effectively in the erection of arches not more than 8 ft. wide. For arching culverts, septic tanks, cisterns, out-door cellars, and other similar structures calling for curved roofs, of concrete or brick it has proved itself very efficient. Four trusses will sustain five or six tons of green concrete or masonry without a tremor. The amount of curve is left to the discretion of the builder, but the writer would suggest a ratio of 1 to 5—1 ft. of rise to each 5 ft. of width.

The following figure is of a truss recently used in sustaining the concrete roof of a septic tank 5 ft. wide. Minor changes, of course, may be made at the discretion of the builder. It takes but a few minutes to make the truss—so easy are the various parts to assemble. A study of the figure will make clear the details of structure much better than long written descriptions.



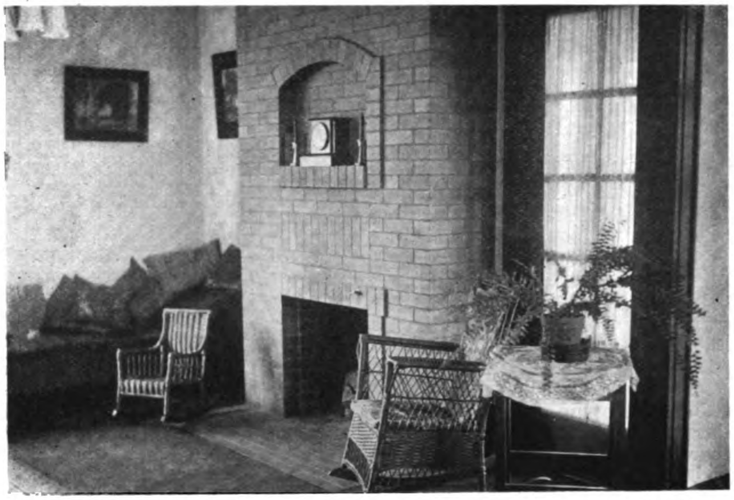
Elevation of Trussed Centering Which Can Be Adopted to Any Desired Curvature

The main pieces of the truss (a) are two in number, and are ordinary 1-in. by 6-in. sheeting. The studding (c) are of the same material as is also the rafter (b). The curved effect is obtained by bending laths from the peak of the rafters to the ends. Blocks of various thicknesses are inserted between the rafters and the laths, thereby securing any curvature.

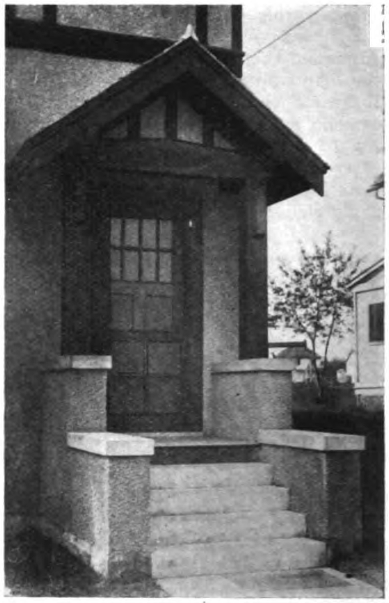
In the septic tank above referred to the writer placed the trusses about 3 ft. apart. The boards constituting the concrete forms were lightly nailed to the lath, four and six-penny nails only being used. The only object in nailing the form boards is to hold them in position, and not to secure added strength. Thus secured they held 7 in. of concrete without sagging.

A Stucco and Timber House in the Middle West

IN building a simple stucco house it is often found that the use of timbers, after the English fashion, lends a softening and mellowing influence to the building. There is a charm and a home-like quality in a house of this sort which cannot be denied. This is exemplified in the residence of **Mr. William Benson** at Northfield, Minnesota, whose home is illustrated herewith.



View of Fireplace, Showing Recessed Clock Shelf



Detail of Main Entrance

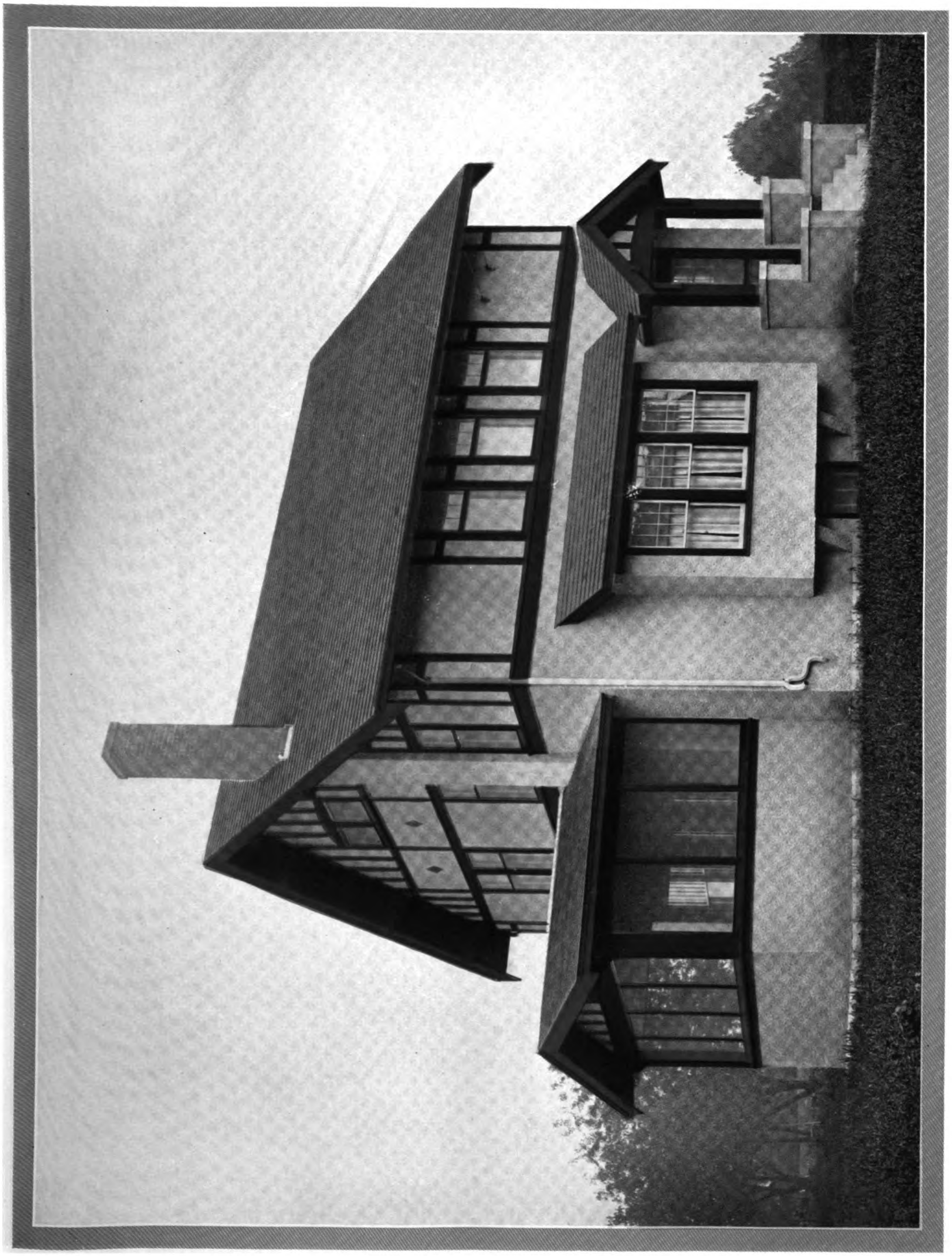
There is a comfortable completeness about this home, as is apparent from the illustrations. One enters from a hospitable little stoop into a small vestibule, which communicates with a large and roomy living room. At the far end of this room is a fireplace, visible immediately upon entrance. Just beyond is a French door leading to the living porch, which is large and airy, being open on three sides. There is also a door leading to this porch from the dining room, making possible its use as a breakfast room in the summer months if desired.

The dining room is as spacious proportionately as the living room, and opens directly into the kitchen. This kitchen would be a joy to any housewife. Witness the immaculately white and extensive cupboards, with flour bins, working counter, and the like. The woodwork in the kitchen is all white except the tops of the counters, which are 1⅛ inch edge-grain fir. The soft light in the kitchen comes to the left of the person working at the counter. There is an enclosed entry (shown in the plan) affording a place for refrigerator and other household utilities. Entrance to the kitchen may likewise be had from the grade entrance at the side, which also gives direct access to the basement.

The second floor is conspicuous in its economy of arrangement. The three bedrooms are spacious and well-lighted; there is ample closet room; the bathroom is unusually large for a house of this size, and there is a sleeping porch at the rear, 8 x 17 feet, which is entered from one of the bedrooms.

The construction of this house followed the usual frame and stucco methods generally. The footings were of concrete in a 1:3:5 mix, with hand stone up to 10″ in greatest dimension used where desired and placed not nearer to forms than 2 inches. Immediately above the grade line there was a course of rock-faced concrete brick. The foundation from grade line to bottom of joists, and the filling between joists was of common hard-burned building tile, laid up to make

Life Out-of-Doors is Encouraged by the Spacious Living and Sleeping Porches Shown in This View of Side and Rear



a 12-inch wall. The outside wall was of concrete, and was given a coat of waterproofing paint from top of footings to top of wall.

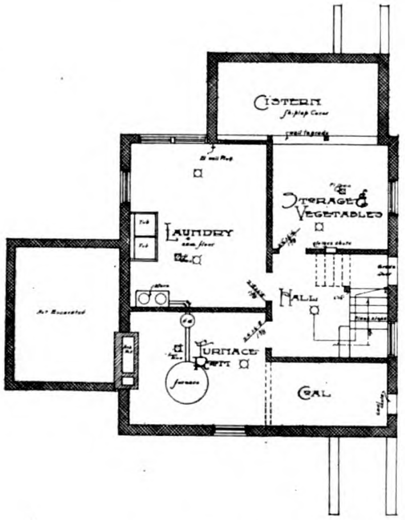

Front Elevation, Scale ¼ in. = 1 ft.

The basement partitions were of the same material as the foundations walls, built up to the bottom of joists only. Two pieces of plank, the same size as the joists, were cut in over the partitions, making the space between joists tight. The basement floor is of cement, three inches thick, the lower part being the same mixture used for walls, and the top ¾ inch being a 1:3 mixture of cement and sand. The house has a large cistern, built in the same manner as the rest of the basement and lined with cement mortar in a 1:2 mix, over which was placed a brush coat of neat cement. A shiplap cover was provided for the cistern.

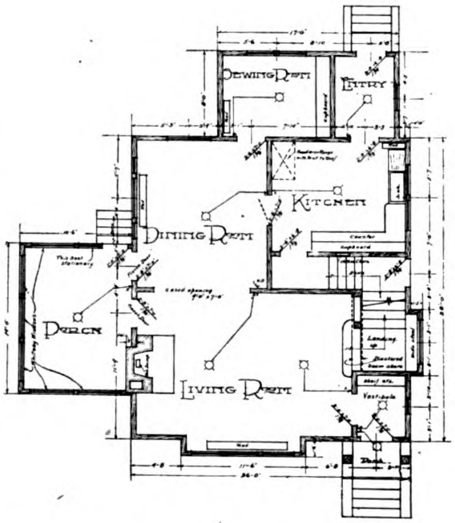
Common brick, laid in a 4" wall, and covered with the same plaster used for the other exterior work formed the chimney up to the roof line. Above this point face brick was used. A 6 inch thimble was provided for a laundry stove, and an 8 x 8 inch cast iron cleanout installed near the bottom of the chimney.

All the ordinary dimension lumber used in the construction of this house was No. 1 Northern pine or No. 1 fir. All outside finishing lumber was "D" finish white pine. The first and second story joists were 2 x 10 inches, 16 inches on centers. All joists having a span of more than 10 feet had one row of 2 x 2 inch bridging in the center of every span. Attic joists were 2 x 6 inches, 16 inch centers, with bridging as specified for the other floors. All partitions were 2 x 4 inch studs, 16 inch centers, with

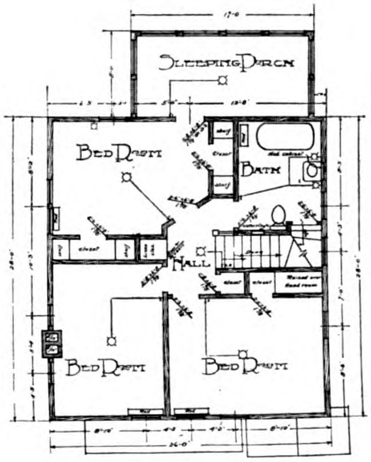

Rear Elevation, Scale ¼ in. = 1 ft.



Basement Plan, Scale ¼ in. = 1 ft.



First Floor Plan, Scale ¼ in. = 1 ft.



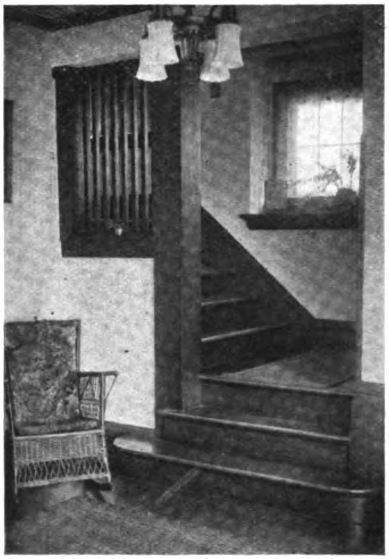
Second Floor Plan, Scale ¼ in. = 1 ft.


Left Side Elevation, Scale ¼ in. = 1 ft.


Right Side Elevation, Scale ¼ in. = 1 ft.

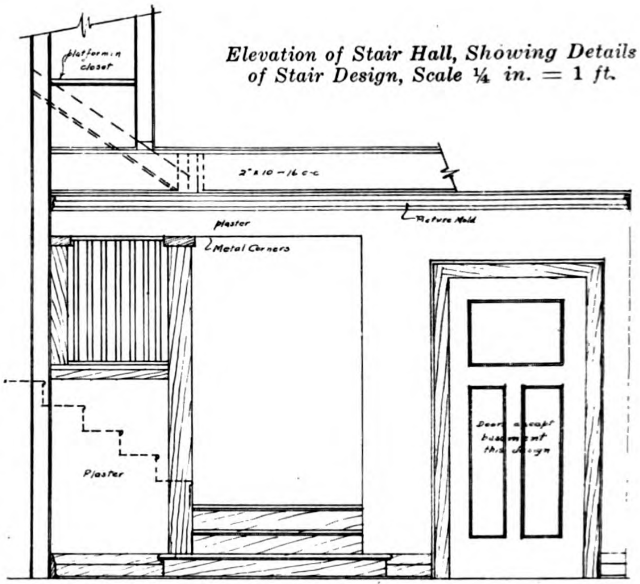
single plate top and bottom, and with double 2 x 4's at sides and tops of all openings. At the springing of the wood partitions 3½-inch bolts were used to fasten studs to tile walls.

The roof boards consisted of No. 3 pine boards, and over these were laid Reynolds slate-surfaced asphalt shingles.

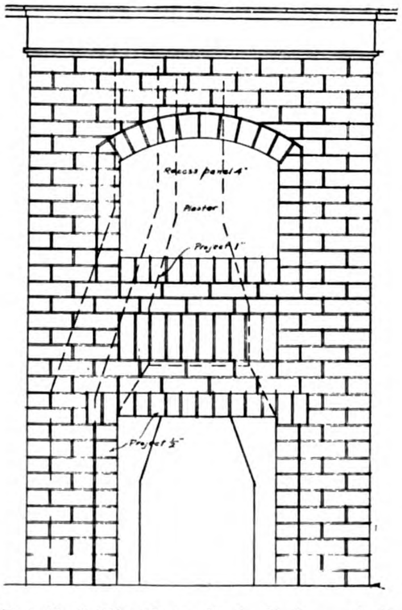


The Stairway. Notice the Soft Light from the Little Casement Window

The outside walls were sheathed with No. 2 Northern pine shiplap, 8 inches wide. Flaxlinum was placed, ½ inch thick, between wall studs, and fastened thereto with lath. The walls were finished with metal lath and plaster as follows: The entire surface was covered with one-ply composition roofing; over this the half-timber strips, shown in elevation and photographs, were applied, together with half-inch stripping for metal lath, not over 16 inches apart. Hy-rib metal lath, 26-gauge, was then securely stapled on and plaster applied. The first two coats of plaster were cement mortar consisting of one part cement to two and one-half parts sand, with some lime in the first coat to make it work smoothly. The outside finishing coat was of "Kellastone" stucco, ⅜ inch thick, with a stipple finish and dry-dashed with marble chips to cover one-third the area of the stucco.



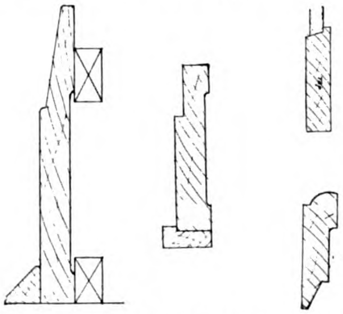
Elevation of Stair Hall, Showing Details of Stair Design, Scale ¼ in. = 1 ft.



Detail of Fireplace, Scale ⅜ in. = 1 ft.

The half-timber strips used on the upper exterior walls were 1⅛ inch clear fir, stained with Cabot's brown creosote stain. The other outside finish was 1⅛ inch thick, "D" stock fir, painted with two coats of lead and linseed oil.

All doors were of first class mill construction, those on the first floor being oak veneered, and those on the second floor being of fir. The front entrance door is glazed with beveled plate; the other glazed doors with double strength "A" quality. This also applies to the sash throughout the building. The interior trim for the first floor living portions of this house are of plain red oak, given a coat of paste filler to bring out the grain of the wood, over which Sherwin Williams' Elastica white shellac was applied, rubbed down with steel wool, and finished with a coat of flat interior varnish. The other portions of the house were finished in fir, stained with Standard Varnish Company's Kleartone oil stain.

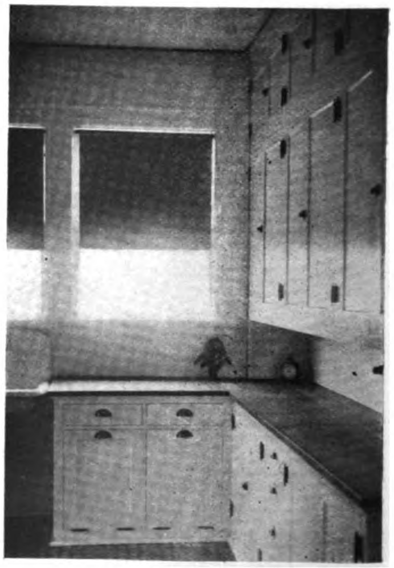


Exterior and Interior Casing Moulds, Base and Picture Mouldings, Shown in Section, Scale ½ in. = 1 ft.

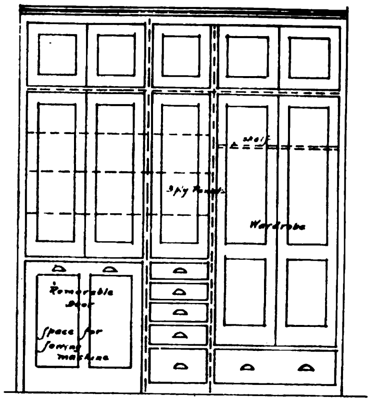
The floors were given much the same treatment, the first story floors being double. The sub-flooring consisted of No. 3 N. P. boards laid diagonally, and upon it was laid 13/16 x 2 inch quarter-sawed white oak. A paste filler and two coats of floor varnish were used as finish for these floors. On the second floor clear birch flooring was used, 13/16 x 2 inches, finished with two coats of varnish. Red rosin paper was used as deadening between rough and finished floors. The stairway was finished like the other floors and trim.

A Honeywell hot water heating system has been installed in this house, and it is lighted with electricity.

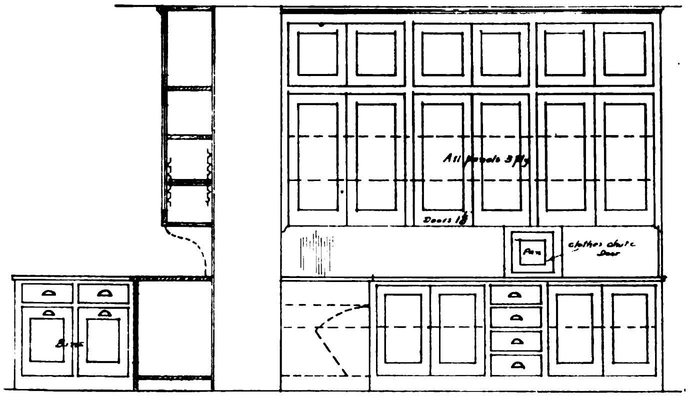
Mr. Thorwald Thorsen of Forest City, Iowa, was the architect for this residence, which is located at Northfield, Minnesota. Mr. William Benson is the owner.



A Corner in the Immaculate White Kitchen, Showing the Ample Cupboard and Working Space

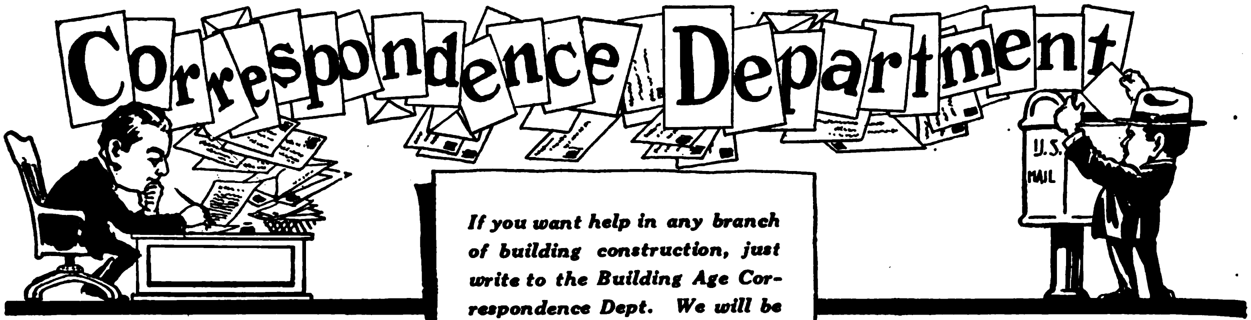


Sewing Room Cupboards and Wardrobe
Scale, ¼ in.-1 ft.



Detail in Section and Elevation of Kitchen Cupboards
Scale, ¼ in.-1 ft.

Correspondence Department



If you want help in any branch of building construction, just write to the Building Age Correspondence Dept. We will be glad to answer all your questions without charge.

Questions should be confined to construction only, as the editors cannot undertake to design structures.

All readers are invited to discuss the questions and answers published.

How Should This Wallboard Paneling Be Designed?

From W. D. T., Long Island, N. Y.—Being a subscriber to the BUILDING AGE I would like to ask you for a point of information. I am remodeling a room 14 x 20-6" with compo board ceilings and side walls. I am also putting in a beam ceiling. On account of ceiling being low, owner only wanted the beams 3½" x 5¼" wide. I laid the ceiling out according to his ideas with 4 panels in center 4 ft. on centers and 10 ft. long. On outer edge I had panels 2 ft. wide on each side as you may see in the sketch. Side walls were laid out in even panels. Panels are exactly alike. The two side walls are alike also. On the walls the owner wanted strips 2" by ⅝" thick to cover seams on compo board. The owner claims that these seams ought to be directly under each ceiling beam so as the 2 in. strips cover each one seam under the ceiling beam. I claim it is not necessary to have them come direct under the beams as the window and door opening would prevent me from having any two panels alike. I would like you to write me on this subject at your earliest convenience.

Enclosed is a sketch of ceiling and one side wall. I would like to know whether I am correct or not.

Answer.—From what you state in your letter I believe you are both right to a certain extent and yet not altogether right. But first let us review what the owner wanted.

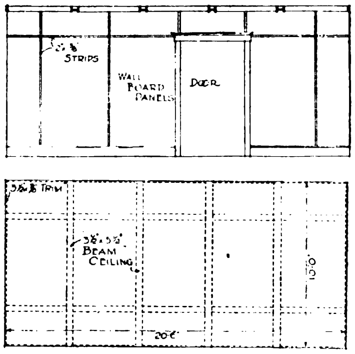
You state that the ceiling paneling was laid out in 4 equal panels of 4' 0" C to C. and 2 smaller ones of 2' 0" at each end of room, which arrangement was as suggested and approved of by the owner. This arrangement as far as it goes impresses me as being O. K.

I noted on the sketch you enclosed of side wall that a door opening is directly below and under one of the false ceiling beams, which would make a poor layout should the vertical strips have been plumb under each false beam.

When the owner stated that the molds covering the beams should have been directly plumb under each false beam he was right, providing the door openings or window openings could have been worked out to come in the center of panels. But if this was not possible the owner is wrong.

I myself would not like the arrangement as your sketch indicates it, as by running the strips to ceiling a relationship is established to the layout of ceiling beams which in good design would call for symmetry. That is, plumb joints under each beam.

As a point of advice I have found that the best way to solve a problem such as you have had to contend with is to lay out and design ceiling, side walls, etc., on paper before the work progresses too far, for by so doing many times the shifting of a door or window ever so slightly will give a pleasing result and symmetrical layout.



Sketch of Ceiling and Side Wall, Submitted by W. D. T.

Another advantage in working ideas of this kind on paper first is that a surprising number of different layouts and combinations can be worked out, and a suitable one chosen.

From the side wall sketch you enclosed

by means of a slight alteration to the stripping it still is possible to correct the condition complained of by the owner and give him satisfaction.

The manner in which I would suggest this be done is to use a molding similar to those used on vertical joints, or some other suitable as a plate shelf. The top of this mold should be at least 1 in. below top of window casings, or so that a 14-in. to 16-in. vertical border will separate ceiling layout from that on side walls.

The vertical strips on side walls above the horizontal mold should first be removed. The joints can be pointed up and surface left smooth for paper. By doing as suggested no relationship exists between the ceiling beams and the strips on walls. With a layout of this kind a symmetrical spacing of strips in regard to beams on ceilings is not essential, and it is not bad design.

As I see it the only mistake you made was in running the vertical strips to ceiling level and not leaving a fascia to break the relationship of ceiling beams to side wall stripping. W. G

Determining Settlement After Buildings Are Constructed

From C. S., New York.—How can the extent of settlement in buildings be determined after they are constructed?

Answer.—A very reliable method and the one usually adopted to determine the extent of unequal settlements in buildings after they are built is to use paper pasters, the procedure in the use of which is as follows:

Should the building be one which is plastered, any settlement would naturally cause it to crack where applied to walls. Where thought to be serious paper pasters should be immediately applied in order that the extent and direction of the settlement can be arrived at.

Paper used for pasters should be of good quality but not too heavy. They should be about 1½ in. in width by about 5 in. in length. Apply glue to one side, firmly press and stretch in position. Pasters must be placed over and at right angles to the settlement crack.

When dry the date should be written upon the face, as in doing so a record can be kept of what the increase in settlement is from date to date and from time to time as other pasters are applied.

After pasters are in position the slightest settlement will cause them to break over he crack, but as they hold firmly on either side all that need be done to determine the amount of settlement since the date a particular paster was set in position, is to measure the distance from the top of the one half to the top of other half if the settlement is vertical, or the distance between the edges if it is horizontal, which gives the exact amount of settlement in a given time.

The same system as above described can be used in determining the progress of settlements in buildings constructed of stone, brick or concrete with equal success.—W. G.

Is This Good Construction?

From F. C. S., Minn.—One of your subscribers of this city has requested me to write you as authority in regard to preparation of exterior for stucco work.

I am about to build a residence at a price in the neighborhood of $6,000, using brick up to the bottom of first floor windows, white stucco to roof and red veneer cement shingles above.

Am awaiting your reply before instructing architect to go ahead with the plans.

In the first place can you recommend 1 in. board sheathing over the studdings, then waterproof paper fastened on with 1½ x 1 in. strips up and down over the studdings, then plaster-board over this to stucco on too?

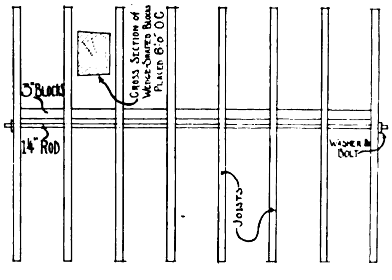
This last feature is the big question, but I understand the State of Minnesota is building a sanitarium at Granite Falls, Minn., in this manner, and will get a warm building at less expense than metal lath, which are now scarce and high in price.

Answer—It would be good construction to us 1 in. sheathing, then waterproof paper fastened on with 1½ x 1 in. strips placed vertically, and plaster or stucco board on top of this. An air space would be created in between the waterproof paper and the plaster or stucco board which would possess good insulating value. The plaster or stucco board is often nailed directly to the studding, doing away with the sheathing and waterproof paper altogether, but this would not result in as warm a house as the method you suggest. E. D.

How Can Shaky Floors Be Stiffened?

From E. G., New Jersey.—I was much interested in the method for stiffening a shaky floor, stated in the June issue. It is a good one.

I have successfully made use of a different method, which is especially successful with a floor that sags or springs considerably under moving loads. Take up a couple of floorboards every 6 ft. in length of the floor and fit wedge-shape blocks in between the joists. These blocks should be the full depth of the joists and cut so that the grain will be at right angles to the joist, so that they will not loosen if the wood shrinks.



A Method of Stiffening Floors by Giving the Floor a Crown Shape

Before placing the blocks in position, a hole should be bored through the center of the joists, and a 1¼ in. rod passed through them. The wedge-shape blocks are then fitted in place and the bar tightened up until the floor becomes crown shaped, due to the shape of the blocks. The floor acts like a truss, and is very stiff under moving loads, although its total strength for a uniformal distributed load is not increased.

How Can a Smooth Surface on Concrete Be Secured?

From B. W., Ohio—I have been doing quite a little concrete work lately, but do not get a smooth surface. A friend of mine advised me that this was due to my not greasing the forms. Is that so? Or could there be some other reason?

Answer—There may be several reasons why you do not get a smooth surface on your concrete, and possibly your not greasing the forms would have the least bearing on the result. In making the statement regarding the greasing of forms, I do not mean that it is superfluous in obtaining a smooth surface, but it certainly is not essential.

The following hints if followed should result in concrete having a smooth surface:

1. A mix of 1 part of cement, 2 parts of clean, sharp sand and 4 parts of gravel or broken stone is a good proportion for concrete.

2. Care should be taken that materials are thoroughly mixed before placing.

3. Too much coarse aggregate is liable to cause trouble.

4. A smooth surface can be more readily obtained by using a wet mix than a dry one.

5. The most important thing as I have found it in obtaining a smooth surface is to spade the concrete well. By spading I mean to use spading iron at the forms as the concrete is poured. This pushes the stone or coarse aggregate away from the outer surface, and when the forms are stripped a thin layer of cement and sand is only to be seen.

In regard to the greasing of forms this also has its advantages. In the first place, it waterproofs the wood, preventing it from absorbing the water in the concrete which swells and warps the centering, which makes it almost useless after using once. If it were not warped and twisted it could be used as centering again or as sheathing or under floor. When forms are greased a thin skin remains on the surface of the wood and prevents the concrete from entering the pores and to a certain extent adhering to it.

When forms are to be used but once, a smooth finish can be obtained if mix, etc., is right, by giving the forms a good

wetting immediately before pouring the concrete.

In greasing forms they should be thoroughly cleaned of all sawdust. If not the grease will be on the sawdust and not on the wood.

For greasing, mineral oils, paraffin, crude or fuel oil are used satisfactorily and are cheap. Excellent results may also be obtained by giving the wood forms a good coat of boiled linseed oil.

W. G.

How I Lower Costs

Two of the Best Articles Submitted in the Contest Announced in the February Issue—Prize of $15 Won by John Upton

Using Material Quickly and Economically

By John Upton

TO put sills on a concrete wall have bolts set in the wall, projecting enough to go through one or two planks. This is just as good as using heavy timbers and saves considerable. When one has to repair large sills, planks may be used to good advantage, as the splices can be readily made and there is no waste as in using large timbers.

In some cases where the entire building is to have new sills you can use plank, either built up to the size of the old sills or less.

The quickest way to get the length of rafters is from the square. Measure across from the figure for the rise to that for the run, though if you are adding a bent onto an old barn, the surest way is to get up and measure the old rafter.

To get the length and cuts of the rafters for a combination roof, that is, when one plate is a foot or more higher than the other, as on some poultry houses, the quickest way is to lay the sticks across the building, allowing for the difference in the plates and the desired rise. Then mark the seat cut square across the plate and the top cut lengthwise of the building.

On a small building over a water tank when the plate was 6 ft. high, I found I could put the rafter on and a roof board over the plate before putting on the vertical siding. Then I could cut the boards the right length and let them fit up against the roof board, and could shift the rafters a little so as to make them come at the edges of the siding boards. The last saved time while the other saved a board that would have been needed for the frieze. The same idea was used on the ends.

In case you are to need a number of boards, say 10 ft. long, some 8 ft., and others shorter, it is well to get the long ones cut first, especially if you are using lumber with some knots. In clapboarding this means fill up the long places first.

In fitting inside base, watertable or cornice it is best to put the long piece on first then the short, as this will save handling the long ones. An exception might be made in clapboarding, as a long piece can be fitted more easily than a short one.

In ceiling, whether on the sides or overhead and in flooring, where there may be several boards of a length, it is often well to cut these first, as they may be cut two or three at a time.

If two or more men are laying floors let one do the sawing, the other the nailing.

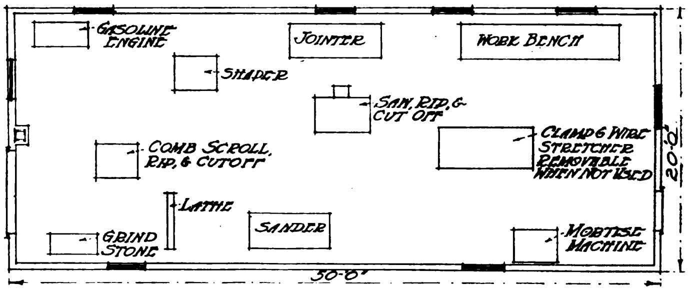
For ceiling overhead when one is working alone, take a piece of board 18 in. long and 3 in. wide with a slot ripped out from the middle of one end as wide as the ceiling is thick. Use it to hold the stuff up by slipping it over the board to be put on and letting it rest on those already in place.

In shingling use a straight edge. If you wish to lay two courses at once have a short piece of board as wide as the courses to lay on above the straight edge and shove along as you go.

Installing Machinery in Carpenter Shop Saves Labor of Six to Ten Men

By J. N. Sartain

In the first place, in order to lower costs in building operations, I have installed several wood working machines as follows: jointer, rip and cutoff saw, with boring attachment and Huther Brother cutter heads for cutting grooves and Dadoes, a 24-in sand-papering machine, mortising machine, shaper, and turning lathe, also a small combination machine for scroll sawing and ripping the pockets in window jambs. This outfit enables me to save the labor of from six to ten men per day on all shop work that can be performed by machinery. Formerly I did my work by hand.



Plan of Mr. Sartain's Shop, Which Enabled Him to Save the Labor of Over Six Men

In addition to these labor saving machines, I have invented a combined clamp and screen wire stretcher, which enables me to save from 30 per cent to 50 per cent of the cost of assembling and wiring screens for windows and doors. This device consists of a main frame, with roller that will hold a full roll of wire, and provided with stop to hold the wire at the proper tension for fastening the wire to the screen. A sliding section, operated by hand screws, to which is attached cranks, is for the purpose of clamping the screen together and holding it in square while the wire is being applied.

Legal Department

Is Owner or Contractor Liable When Building Is Destroyed in Course of Erection or Repair?

The question of who must bear the loss occasioned by the destruction of a building while in the process of erection or repair is always an interesting one, especially where the destruction is not due to the negligence or neglect of either party.

In one of the recent cases decided a short time ago in California it was held that where one contracts absolutely and unqualifiedly to erect a building and the contract is entire, so that its completion is a condition precedent to the right to payment for any part of it, the contractor must bear the loss, no matter what its cause may be, unless, of course, it was caused through the fault of the owner.

In a recent Quebec case it was decided that one who undertakes to paper and paint a house, and furnishes his own materials, must bear any loss occasioned by accidental destruction by fire while the work is in progress, even though the quantity of the material and the price of the work cannot be ascertained until the job is finished.

This Quebec case was decided under a statute which provides that:

"If the workman furnishes the materials and the work is to be perfected and delivered as a whole at a fixed price, the loss of the thing in any manner whatsoever before delivery falls upon himself unless the loss is occasioned by the fault of the owner or he is in default of receiving the thing."

Statutes very similar to this one are in effect in some of the states.

In a Kentucky case where there was a contract to move a barn which burned down before the contractor could move it, the court held he was liable to repay to the owner the unearned payments which he had received as advances.

Where there are so-called entire contracts it has been repeatedly decided that a contractor cannot recover for foundations laid or for part performance, when he has contracted to erect a completed building.

The decisions are different, however, when the contract is "severable" instead of "entire." Thus in one case where the contract price was to be payable in installments as certain portions of the work were finished and the building was destroyed after an installment had been earned, the contractor was allowed to recover the installments due for finished work, and the owner was held to be the person who should bear the loss even though there was a provision in the contract that the property should be the contractor's until the contract price was fully paid.

Where work is to be done on existing buildings there is an implied condition that the property shall remain in existence.

Where a building is destroyed a contractor is therefore allowed to recover the reasonable value of the work already done where the destruction occurs without the fault of either party.

In cases like the above a sub-contractor is allowed to recover from the contractor for the reasonable value of the work and materials he has furnished.

George Kaiser, LL.B., our legal adviser, will answer any questions whose solution will aid in clearing up legal difficulties that subscribers may be in. He will answer direct by mail and give his opinion as to the correct procedure. Such of the questions and answers as are of general interest to the trade will be published in these columns.

All inquiries must be accompanied by the name and address of the correspondent, so that he may be answered direct or that he may be requested for further information if necessary to the intelligent answering of his question. No names will be published, only initials or a nom de plume. Remember that this service is free to subscribers.

Address Legal Department, Building Age, 243 West 39th Street, New York City.

Can This Man Lose His Property on an Agreement to Trade?

From R. P. C., Charlotte, N. C.—I have a rather complicated question to ask regarding a trade that I shall appreciate an answer thereto.

I had a skating rink and traded same as part payment on house and lot. There was also found a dollar in presence of witnesses. I had looked at the property some few days prior to the trade and had informed the owner that I saw nothing in his offer. On the day of the trade he made a little proposition and without further looking at his property I traded, but the trade was conditional in that I asked him if sewer had to be put in the house and if such was the case I would not trade. He said sewer did not have to be put in the house. (The law requires the sewer to go in house if it is in front of the premises.) The agreement about the sewer was between the owner and myself, no one being present at that time.

When I went home to dinner I told my wife I had traded the rink for part payment ($300) on a house and we went to look at it. The party living in the house said sewer had to go in. To further satisfy ourselves regarding the sewer we went to the health department and they said sewer connections must be made at once and notice had been served on the owner as he (Supt. of Health) thought several days after we found that the notice to convict had not been served, but was served on to owner a few days later. The next day after the trade was made, the man I traded with seized the rink (I had previously given him a key) and put my men out. This was on Saturday. On Friday he tendered me the deed to have it looked over by a lawyer, but I declined to accept it, telling the owner that I could not handle it if sewer was to go in. The property is not in a very desirable location and the sewer connection would make it unprofitable. I signed no papers nor gave him anything in writing. He is now sueing me for the balance of $800. I thought at one time I might let the rink go, as I do not value it highly but will lose about $300 on account of the project. My wife and another party heard him say that he said he told me I did not have to put in a sewer but he added that he had not been notified, which he had not said when we traded. I was quite certain that there

was no sewer in the street, but it had been put down in the last three months. I believe I have covered all the points.

The question is, can he make me pay for and take the house? If I win I can sue him for damages for taking my rink and business. I have questioned the advisability of going to court as I am a city official and don't want the publicity. However, he is suing me and I will have to go to court. He might settle by me letting him have the rink without further proceedings.

Answer.—My opinion is that you would be foolish to back down and to allow the other party to ride over you rough shod. From your letter it would seem that no deeds were exchanged by you with the other party. If that is the case there really was only an agreement to trade instead of a bona fide trade. The right of the matter seems to be on your side, particularly if the other party was guilty of fraud and misrepresentation in warranting that it was not necessary to lay a sewer on the property which you were to take. Under the circumstances in this particular case I think that the best thing you can do is retain local counsel to look after your interests. If you state the case fully and fairly to him I think that he will very likely be able to pull you out of your scrape without a loss.

When Owner Takes Possession, Does He Waive Right to Damages If Construction Is Faulty?

Where a contract for construction of a building provides for forfeiture of rights in case of a failure to make payments when due, the fact that the buyer takes possession of the house and makes payments of the contract price in full does not waive his cause of action for faulty construction, especially when he gives written notice that he will claim damages.

A contract was entered into wherein it was provided that a house was to be erected in a good and workmanlike manner and that payments were to be made in instalments by the buyer.

The house was completed and the buyer made full payment and took possession. He then started suit for $2,000 damages for breach of contract, claiming the house had not been erected in a good and workmanlike manner.

The builder contended that the buyer had waived his right to make a claim for damages by taking possession and paying for the house.

It was decided that a right of action for damages is not necessarily waived by the mere fact of payment with knowledge of defects or the taking possession of the subject matter of the contract, but these facts may be considered on the question of waivers of this character, and it was held that the buyer was entitled to his suit for damages.

What Laws Govern the Practice of Architecture in Various States?

From J. F., Detroit, Mich.—I take the liberty of using your Legal Department and would like to get information on the following points:

1. Is a license necessary to practice architecture in Michigan? In Ohio, as far as I know, there is no license necessary, at least no examination.

2. If there is a license necessary, why can some concerns sell plans and specifications and conduct a mail order business?

3. Can parties be prosecuted in Michigan if they practice architecture; that is, sell plans and specifications and advertise it?

Answer.—It is necessary to have a license to practice architecture in Michigan and in a number of other states. In these states it is also necessary to go through an examination before a person can become a certified architect.

Some of these statutes are as follows:

California.—Statute passed in 1901 provides that the State Board of Architecture has power to grant certificates to practice architecture on examination. Ex. p. McManus, 151 Cal. 331, Fitzhugh vs. Mason, 2 Cal. A. 220.

New Jersey.—By a 1912 statute a state board was given power to examine persons and issue certificates to practice architecture on the payment of a fee of $20. Cardiff vs. State Board of Architects, 69 N. J. L. 172.

Quebec.—An architect must show he is registered under Quebec Act (61 Vict., chap. 33, par. 14) as a member of the association of architects to get benefit of rates fixed under Quebec statute (54 Vict., chap. 59, par. 11), which is made evidence of the value of the services of members of the association by the act. Beaulien vs. La Pierre, 26 Quebec Super. I.

Tennessee.—Tennessee also has a statute which provides for the issuance of a certificate upon examination.

New York.—It is provided by statute that architects shall be registered with a State board of examiners and shall receive a certificate after passing the examination and paying the fee. Persons improperly holding themselves out to be registered architects can be held liable for a misdemeanor.

It has been decided that a municipality can impose a license tax on architects who are practicing within the limits of the municipality and by statute or ordinance may make it a misdemeanor to practice without a license, or may provide that it is a misdemeanor to practice without a license unless the architect informs his clients that he is not licensed. Peculiarly enough, however, the fact that an architect is not licensed does not make his contract for services invalid. The Court held in one case that, although a contract to render services as an architect may not lawfully be performed until the certificate required by a state has been obtained, yet such a contract is not illegal merely because it was made in advance of the issuance of the certificate.

Under some statutes, like the Illinois statute, the board which is authorized to examine architects and license them may revoke licenses because of dishonest practice or other good cause shown if it proceeds in the way the statute directs.

I have been unable to find any statute as to licenses in Ohio.

Where there is a statute of course no one but a licensed architect can properly practice architecture. It is permissible, however, to publish and sell books and magazines pertaining to architecture just as it is permissible to publish books and magazines pertaining to medicine or law.

If you have a complaint to make against some Michigan concern it would be advisable for you to correspond with the State Board, which will be glad to take the matter up.

When Architect Delays Work, Who Is Responsible?

In a recent interesting case it was decided that when an architect employed by an owner to superintend the construction of a building, to have direction of the work and to make decisions binding on both parties, unreasonably delays the contractor and allows other contractors to obstruct the work, making it necessary to do the work in an unusual manner which is more expensive than usual, the owner is responsible for damages caused by the action of the architect because the architect is acting as his agent.

It was decided that there was an implied agreement that an owner who had made a contract to have excavations made for a building would give the contractor such possession of the premises as he needed to do the work and would do nothing to obstruct him.

How Can a Name Be Changed?

From C. R. C., New York.—Would it be advisable to change my name because it has considerably embarrassed me since the war started. How would I do this?

Answer.—You should be judged by your actions and not by your name, for which you are not responsible.

Of course, you are the best judge whether or not it would be well to change it.

If you decide to change it you had best consult some local attorney who can apply to the court on your behalf for permission to make the change. You could not do this without your attorney's assistance for it is necessary to prepare a petition, advertise and show why the change is desirable.

THE EDITOR'S PAGE

What Is Being Done to Put the Building Industry Upon a War Basis

How to best adjust the building industry to the Government's requirements was the main topic of the conference called by the A. I. A. for June 14 in New York City.

The result of the conference was the adoption of a resolution embodying the recommendations that:

A committee of eleven on the national organization of the building industry be appointed. The functions of this committee are:

1. To prepare an outlined plan for a proposed national organization of the building industry, which would place its resources at the disposal of the Government so that they might be utilized most efficiently.
2. To continue during the war the production of permanent wealth to the largest extent practicable, consistent with war needs.
3. To take steps to conserve the organization of the building industry in such a manner that it will be able to resume its normal activity as soon as possible after the declaration of peace.

The committee is to report its plan to a general conference of the building industry, the date for which has not yet been fixed.

The conference was of a more informal nature than at first proposed, and was attended by 40 representatives of organizations within the industries.

This committee has the power to do a great deal of good for the trade. It is to be sincerely hoped that its investigations and recommendations will be of such sound nature that the general conference to be called later will be able to place the trade upon a more stable and certain basis than it is at present.

The Editor Meets Some Men with Live Ideas

I have recently come into contact with several different men who are good examples of what can be done by a live-wire in combating unfavorable business conditions.

One is a bicycle dealer in a small town. Prices of many makes of bicycles have just been advanced about 15 per cent, and the condition of the iron and steel market is such as to render further advances likely. This dealer has analyzed out the situation. He decided that bicycles are going to be hard to get, and that they will be almost prohibitive in price. He is preparing to meet the impending blow in this way:

He is acquiring second hand machines and preparing to buy separate parts direct from the jobbers. In other words, he is going to buy up old frames for a mere song, take advantage of the saving afforded by buying parts direct from jobbers, eliminate the manufacturers' profit for assembling, and turn out a bicycle that will favorably compare with a new machine at a price that will be below anything that a competitor can quote.

But you say that such a thing cannot be done in the building business. Here is an example of how one western builder is meeting lack of material:

This chap could not buy brick; freight and other adverse conditions were holding up work that he could go ahead with if he could solve his problem. So he decided to make his own brick. He wrote to me, asking to be put in touch with manufacturers who sold brick making machinery. He explained that he expected to not only meet his own wants but also to meet those of other builders located in his vicinity who were in the same predicament as he.

I recently traveled through a section of New Jersey which has a number of small holdings of standing timber, a few acres here and there. I saw a small portable saw-mill working hard, and investigated. A live wire lumber dealer owned it, and was manufacturing his own material. The freight shortage was not bothering him.

A wide awake real estate man has been talking to me about a project that he has in mind. He is considering the purchase of 115 acres of woodland, growing on stony ground. His idea is to build small bungalows on the tract, using the stone that is on the ground and manufacturing his own lumber by means of a portable saw mill.

A builder in upper New York State told me that he had found himself unable to readily get some 6 x 6 timbers that he needed for building a barn. So he bought a tumbled down house, wrecked it, and had plenty of well seasoned material for his purpose.

One man will write into this office saying that business in his town is dead. Another man in the same town will write in, saying that he is rushed taking care of the work that is flowing into his hands. I have observed this not once, but several times.

Why is it? Is the building business so dead that there is no work to be had? Or is there work which only a live wire can get?

I believe from personal experiences, some of which I have just cited, that there is a certain amount of business which can be developed and handled by the right man. He must be a man of imagination, of initiative, and able to meet unfavorable conditions. He must be absolutely unable to lay down on the job and say "It can't be done." Are you that kind of a man?

Steps Are Being Taken to Fix Lumber Prices

Developments in Washington show clearly that the Government is going to fix commercial lumber prices. At this writing nothing definite has been done, but concrete developments are momentarily expected.

The principal reason for price fixing proposals lies in the fact that Government purchases have been on too low a basis, while everybody agrees that the consumer is paying much too great a price. As a consequence, many mills have sold to the trade rather than to the Government.

Heretofore, the Government has merely fixed the prices at which lumber should be sold to itself, not concerning itself with what the mills charged others.

It is probable that prices will be fixed on an f.o.b. mill basis, freight charges and profit to the dealer being added in arriving at the cost to the consumer. As a consequence, prices will vary in various localities in direct proportion to freight charges.

Prices on Douglas Fir and Southern Pine will probably be fixed before other woods are considered, owing to their wide use in shipbuilding.

Manufacturers Must Work for After the War Trade

How about American trade after the war is over? Are we preparing ourselves for the commercial battle that must ensue, whoever wins?

There is much talk of boycotting German products, of keeping the Hun from the markets of the world. Much of this talk is mere wind, an idle vaporing that is incapable of being backed up by those manufacturers who are lacking in nerve and sand.

Publicity *now* constitutes the best method of boycotting German products. Don't talk what you are going to do, do your best now. American business men are only too often hesitant, fearful, unwilling to back their name and good will by a continuance of publicity. This is giving the Hun his chance for world supremacy in trade. Read what two of the leading German newspapers have to say when comparing the business nerve of the Huns to that of the Americans:

"If the despised Yankee nation think they are going to win the war and force Germans out of foreign markets there is

nothing to indicate this sentiment in their local and foreign advertising. Many of their advertising agencies have closed their doors through lack of patronage. Their much-talked-of captains of industry have canceled advertising contracts everywhere. Germany and German merchants have increased their advertising space in neutral markets and at home. It pays to advertise in war as well as in peace. The far-seeing merchant never stops advertising."

"Nothing is more acceptable to the German nation than to note the fact that the North Americans have abandoned advertising their goods in practically all of the foreign markets. In the Latin-American publications, the market which they have always tried hardest to acquire, there has been a heavy loss of advertising. A prominent Buenos Aires agency announces the fact that 83 per cent of their United States advertisers have canceled their contracts. This is also true in the Orient, and a careful compilation of the decrease in advertising there shows a greater depreciation than in South and Central America. In the United States itself there is not a paper which has not suffered a loss in its advertising lines, and that despite the fact that the last year showed an increase in the millionaire class of 973 individuals. In other words, the war has terrorized the American nation, but not the Germans, for a perusal of their periodicals will show that manufacturers still advertise even if they have not the goods to deliver, but with the idea of keeping their name before the public."

The first of these quotations is from the Berlin *Tageblatt* for April 26, 1918; the second is from the Berlin *Lokal Anzeiger*, April 20, 1918.

What do you think of the chance for American business to capture trade in the face of superior "during the war" German propaganda?

We must wake up. We must prepare to fight a battle for a supremacy in business life and ideals that cannot be won if we lay down now and wait till the war is over. Manufacturers only too often do not realize the great yet ephemeral value of their name, their trade mark, their good will, and their enviable business advantages which years of square dealing have won.

The business man who nails his flag to the mast now is going to sail into the great after-the-war trade with success already in his grasp. Go to it!

Building Activity Throughout the United States

A loss of 44 per cent in building activity is shown for the month of May, 1918, as compared with May, 1917. Of 128 cities reporting, 36 show a gain as against 92 reporting losses.

The Eastern section of the country shows a loss of 42 per cent, 9 out of 40 cities showing gains. The middle section of the country makes a better showing, the loss being 27 per cent. The South reports a loss of 23 per cent, 9 out of 24 cities reporting gains. The West reports only 10 per cent loss, 7 cities out of 18 cities enjoying gains.

There is nothing new that can be said about the situation. The Government is making use of plenty of men and material, but private interests are, in the main, inactive.

CITIES IN EASTERN STATES

	May, 1918				May, 1917			
	New Work		Repairs		New Work		Repairs	
	Permits	Value	Permits	Value	Permits	Value	Permits	Value
Albany, N. Y.	169	$199,040	...	....	298	$351,540	...	....
Allentown, Pa.	48	202,720	...	....	78	395,760	...	....
Altoona, Pa.	58	21,567	...	....	40	24,897	...	....
Atlantic City, N. J.	9	28,375	99	48,916	15	64,060	92	18,917
Auburn, N. Y.	24	45,155	...	....	32	19,344	...	....
Bayonne, N. J.	21	59,080	...	....	17	83,900	...	....
Binghamton, N. Y.	99	33,017	95	12,167	137	102,849	207	27,195
Boston, Mass.	66	533,152	411	377,446	137	2,083,068	339	821,401
Bridgeport, Conn.	158	310,002	...	....	166	545,057	...	....
Brockton, Mass.	15	9,170	17	12,450	44	50,099	15	11,910
East Orange, N. J.	38	165,621	...	....	61	210,226	...	....
Elizabeth, N. J.	64	229,048	...	....	48	189,960	...	....
Erie, Pa.	179	197,013	...	....	230	689,099	...	....
Harrisburg, Pa.	26	19,325	...	....	37	190,940	...	....
Hartford, Conn.	128	469,700	...	....	161	1,197,727	...	....
Hoboken, N. J.	7	56,700	17	18,320	6	19,500	16	24,413
Holyoke, Mass.	9	12,775	3	3,500	12	32,900	6	12,175
Lawrence, Mass.	12	14,025	8	13,630	12	47,375	18	19,930
Manchester, N. H.	81	47,845	...	....	121	547,530	...	....
Mount Vernon, N. Y.	21	23,235	6	5,475	13	14,210	23	5,520
Newark, N. J.	214	594,082	...	....	298	1,164,433	...	....
New Bedford, Mass.	44	163,300	...	....	49	117,500	...	....
New Britain, Conn.	30	43,260	27	5,522	38	139,760	20	19,210
New Haven, Conn.	130	269,469	...	....	167	543,154	...	....
New York:								
Manhattan	16	982,850	298	1,012,623	46	1,381,800	408	1,363,628
Bronx	32	488,350	241	111,286	102	1,373,150	95	95,633
Brooklyn	255	2,323,220	813	463,873	147	1,984,300	1008	549,629
Queens	357	743,510	...	....	836	2,185,666	...	....
Richmond	88	211,634	...	....	122	342,314	...	....
Niagara Falls, N. Y.	62	116,215	...	....	71	193,314	...	....
Nutley, N. J.	5	7,600	4	160	8	8,850	15	395
Passaic, N. J.	13	33,475	14	42,650	20	201,750	20	32,775
Paterson, N. J.	115	115,545	...	....	119	167,027	...	....
Philadelphia, Pa.	404	1,403,060	358	268,990	597	3,215,845	374	333,510
Pittsburgh, Pa.	343	771,381	...	....	414	948,143	...	....
Portland, Me.	20	16,687	22	73,040	30	64,788	19	18,160
Quincy, Mass.	82	156,208	...	....	75	109,520	...	....
Reading, Pa.	30	96,475	153	62,225	66	71,875	168	63,350
Rochester, N. Y.	116	103,619	92	74,111	195	477,040	102	269,131
Salem, Mass.	37	11,802	...	....	22	142,800	...	....
Schenectady, N. Y.	41	140,590	44	12,604	71	85,585	41	16,480
Scranton, Pa.	31	61,245	...	....	61	280,543	...	....
Springfield, Mass.	123	447,275	...	....	199	739,659	...	....
Syracuse, N. Y.	104	159,695	...	117,690	125	477,484	...	195,836
Trenton, N. J.	40	58,129	...	....	61	160,332	...	....
Troy, N. Y.	5	23,500	19	19,750	...	....	...	....
Utica, N. Y.	38	56,430	29	41,400	43	141,475	13	23,920
Wilkes-Barre, Pa.	97	41,763	...	....	107	195,773	...	....
Worcester, Mass.	184	232,833	...	....	298	1,009,004	...	....
	4655	$13,816,502	2887	$2,900,178	3046	$25,097,483	2999	$3,923,118

CITIES IN MIDDLE STATES

	May, 1918				May, 1917			
	New Work		Repairs		New Work		Repairs	
	Permits	Value	Permits	Value	Permits	Value	Permits	Value
Akron, Ohio	283	$511,956	...	....	885	$2,431,213	...	....
Boise, Idaho	...	....	25	$5,820	2	30,000	28	$9,570
Canton, Ohio	134	332,725	...	....	155	441,190	...	....
Cedar Rapids, Iowa	33	79,000	...	....	56	179,000	...	....
Chicago, Ill.	379	3,752,500	1209	382,265	619	6,552,800	...	....
Cincinnati, Ohio	1014	389,885	...	....	1281	1,039,780	...	....
Cleveland, Ohio	184	1,161	931	295,160	425	2,780,500	1045	405,000
Columbus, Ohio	139	165,640	100	74,635	161	447,060	84	53,250
Davenport, Iowa	158	148,189	...	....	160	174,767	...	....
Dayton, Ohio	154	417,053	...	....	184	215,024	...	....
Des Moines, Iowa	94	228,945	...	....	57	263,880	...	....
Detroit, Mich.	597	1,413,715	...	....	1287	3,697,295	...	....
Dubuque, Iowa	12	123,674	...	....	30	40,085	92	53,838
Duluth, Minn.	84	236,500	78	104,470	115	222,959	...	....
East St. Louis, Ill.	25	113,892	10	10,900	35	71,300	...	....
Evansville, Ind.	12	19,172	40	6,636	28	30,870	88	46,217
Grand Rapids, Mich.	141	137,602	...	....	203	184,987	...	....
Indianapolis, Ind.	479	445,422	...	....	641	775,802	...	....
Kansas City, Kan.	38	65,450	...	....	48	196,670	...	....
Kansas City, Mo.	197	454,455	...	....	352	1,291,400	...	....
Lincoln, Nebr.	29	142,910	...	....	56	107,040	...	....
Milwaukee, Wis.	389	708,826	...	....	434	1,263,900	...	....
Minneapolis, Minn.	510	630,155	...	....	736	917,750	...	....
Omaha, Nebr.	133	504,205	...	....	142	1,008,787	...	....
Peoria, Ill.	29	70,875	...	....	76	231,919	...	....
Saginaw, Mich.	33	33,070	...	....	35	38,067	...	....
St. Louis, Mo.	281	520,110	380	272,861	393	736,582	465	302,659
St. Paul, Minn.	229	6,776,218	...	....	233	877,244	...	....
Sioux City, Iowa	70	316,715	...	....	68	478,770	...	....
South Bend, Ind.	69	63,346	28	11,749	135	172,633	25	17,020
Springfield, Ill.	78	161,225	...	....	59	111,910	...	....
Superior, Wis.	88	90,005	...	....	105	106,052	...	....
Terre Haute, Ind.	45	29,268	37	16,710	49	27,875	...	....
Toledo, Ohio	239	184,739	...	....	506	1,176,969	...	....
Topeka, Kan.	19	5,343	...	....	29	11,665	...	....
Wichita, Kan.	95	508,346	...	....	94	194,685	...	....
Youngstown, Ohio	213	457,050	39	312,530	188	385,580	30	89,225
	6706	$20,239,342	2877	$1,493,736	10062	$28,914,010	1907	$976,779

CITIES IN EXTREME WESTERN STATES

	May, 1918				May, 1917			
	New Work		Repairs		New Work		Repairs	
	Permits	Value	Permits	Value	Permits	Value	Permits	Value
Berkeley, Cal	11	$32,000	46	$22,500	34	$90,000	51	$20,000
Colorado Spgs., Col.	11	8,225	18	5,663	9	26,220	14	4,995
Denver, Col	125	494,450	113	47,450	121	219,840	130	71,100
Eureka	2	2,700	1	100,000	10	10,500	5	2,075
Long Beach, Cal	188	327,842	...	....	65	5,425	...	....
Los Angeles, Cal	368	1,113,395	271	192,451	251	579,104	227	203,547
Oakland, Cal	180	347,576	79	30,367	174	446,239	62	19,192
Pasadena, Cal	17	39,040	43	14,715	50	99,586	41	12,028
Portland, Ore	452	343,190	...	....	285	390,880	...	....
Pueblo, Col	40	58,407	...	....	39	19,240	...	....
Sacramento, Cal	74	368,967	...	....	86	213,171	...	....
Salt Lake City, Utah	105	420,850	...	....	91	329,410	...	....
San Diego, Cal	34	52,234	48	19,335	38	42,000	61	17,765
San Francisco, Cal	76	634,024	331	171,250	317	2,782,195	328	107,398
San Jose, Cal	31	164,752	...	....	41	32,075	...	....
Seattle, Wash	1119	863,760	...	....	687	1,014,070	...	....
Spokane, Wash	45	44,058	30	14,930	59	425,970	51	50,340
Stockton, Cal	70	96,209	...	....	75	121,886	...	....
	3298	$5,890,498	1072	$736,210	2432	$6,847,811	970	$444,450

CITIES IN SOUTHERN STATES

	May, 1918				May, 1917			
	New Work		Repairs		New Work		Repairs	
	Permits	Value	Permits	Value	Permits	Value	Permits	Value
Atlanta, Ga	96	$359,344	138	$79,079	66	$274,323	121	$98,848
Baltimore, Md	168	237,094	663	132,600	302	684,460	641	128,200
Birmingham, Ala	49	48,625	231	41,974	46	61,458	322	48,571
Charlotte, N. C	34	217,982	...	....	20	60,475	...	....
Chattanooga, Tenn	156	77,276	...	....	197	55,005	...	....
Corpus Christi, Texas	6	350	...	....	10	10,445	...	....
Dallas, Texas	14	41,555	35	49,715	52	392,745	33	22,590
El Paso, Texas	165	73,500	..	....	201	366,220	...	....
Fresno, Cal	71	124,680	51	92,810	45	143,565	37	27,935
Jacksonville, Fla	35	92,120	...	....	24	15,765	...	....
Fort Worth, Texas	51	333,055	...	....			...	....
Houston, Texas	...	....	...	....	53	246,065	...	....
Huntington, W. Va	38	45,080	...	....	58	181,035	...	....
Louisville, Ky	98	378,182	75	45,322	59	87,810	87	49,020
Memphis, Tenn	112	271,635	...	....	174	201,105	...	....
Miami, Fla	..	202,850	...	....	...	243,475	...	....
Montgomery, Ala	105	30,849	...	....	113	14,590	...	....
New Orleans, La	37	133,829	20	13,820	90	284,715	9	11,130
Norfolk, Va	78	339,513	...	....	53	299,741	...	....
Oklahoma City, Okla.	112	305,700	...	....	110	313,034	...	....
Richmond, Va	24	49,875	64	43,280	60	952,230	54	68,865
San Antonio, Texas	246	773,800	...	....	113	142,545	...	....
Savannah, Ga	28	77,905	...	....	41	136,300	...	....
Washington, D. C	142	580,785	292	189,312	161	1,703,510	282	101,690
Wilmington, Del	91	264,190	85	75,840	21	45,403	56	132,961
	1956	$5,059,774	1654	$763,752	2069	$6,916,019	1642	$689,810

Putting Personality Into Letters

A Few Pungent Paragraphs on How to Make Your Letters Pull by Personality

By R. F. Duysters

PERHAPS some of you men have always thought of personality as being something which young ladies of marriageable age, lacking good looks and physical charm, attempt to cultivate in order that they may triumphantly lead some poor unfortunate to the altar. True, it is sometimes used, or I'd better say abused, in this way, but a dissertation on this subject just now is not the purpose of the writer.

Personality as a business asset is the subject which we are going to discuss here and without further introduction. The dictionary gives three or four definitions of personality, but the one I like best is, "That which constitutes distinction of person."

Let me say before going further that frankly I do not believe you can manufacture personality and put it into your letters. It might be clearer if I said I do not believe you can force personality into a letter by linking together a string of words which are not an integral part of you. Personality constitutes a distinction of person—it's you, and the minute you attempt to force it your letter becomes artificial and loses whatever charm it may have had. I don't believe I shall ever forget the advice I was given some years ago by a man who has since produced thousands of dollars' worth of business for his concern by means of his writing ability. His advice was short and to the point. "Write as *you* would talk," he said. This means write as you yourself talk, not as you've heard others talk or as you'd like to talk. If only more of us would remember this, how much more pleasant the reading of the daily mail would be.

Many actors find it impossible to repeat the words of the playwright as they are written on the manuscript. It is often necessary to make a change here or there in order to make the speech more natural. And naturalness in letters is another essential for the man who wants to build his business by mail as well as by other means.

New York some years ago had a mayor who made himself famous by his letters. Mayor Gaynor put his personality into his letters. His quotations from Epictetus were talked about even outside of New York City, and those who received a letter from him treasured it highly. We've had other mayors before and since. They have all written letters, but we don't hear them talked about very much. That is, of course, except possibly by those who receive them, and then there's something said, and that not always complimentary to his honor the mayor, either.

I had an experience some time ago

which brought some of these things home to me and made me realize how necessary it was to be careful and not to write things you can't back up personally. I had been working hard on some old accounts, and to one man in particular I had written many letters, all of which failed to elicit a response. My boss said the chap was good for the money and that I'd get it if I kept after him in the right way. He mentioned further that he knew that the man to whom I was writing was a golf devotee. That was enough for me, because I myself belong to the clan who find sport in chasing the little white ball over the turf, and I knew I could talk his language. So I sat right down and wrote the following letter, as near as I can remember:

"Dear Mr. Blank:

"I'm in wrong.

"You can help me out by just a few strokes of the pen. Will you do it? But let me explain first.

"Your firm owes us some money. Not much, that's true; but still the account is open on our books and every now and then the boss asks me if I've heard from you and thus far my answers have been in the negative. He waxed rather sarcastic yesterday and seemed to imply that if I'd written the right kind of a letter to you I would have received a reply. In other words he blamed me for your silence. So that's why I'm making this personal appeal to you to help me out.

"I've got two weeks' vacation coming to me starting next week. I've been polishing up my sticks and have put in a supply of 'Red Dots,' and I'm ready to do 18 holes in 80 and maybe less. But I'd feel better, I'd enjoy that game more, if I had your account off my mind. Then I'd be perfectly carefree and could concentrate on my approach shots and putting. I usually make a good getaway but fall down on the approach shots.

"Well, I guess I'm getting off the main track but perhaps you can understand. Have you ever played golf?

"Sincerely yours,"

And now what was the result? About two days later the girl brought me a card. Mr. Blank would like to see me. I must confess I felt a bit nervous at first. Maybe I had overstepped the mark. However, I was in for it, so I went out to see him. Mr. Blank was a tall ruddy-faced man of perhaps 45. He had a deep booming voice and a hearty handshake. He was tickled with the letter, which he had with him, and I was tickled to see that he had also brought along a check in settlement of his accounts. I had hit the nail on the head (with the helpful hints from friend boss). He was a golf enthusiast.

Now the point of this recital is this: I *do* play golf—the boss *did* speak about the account—I was going on a vacation—I *am* poor with my irons and short strokes and thus when I met Mr. Blank face to face we talked for half an hour about brassie shots and various courses over which we had played, etc. But think how I would have felt had I been feigning to understand golf! That is why I advocate naturalness and warn against the manufacturing of atmosphere and personality. If you can't be natural be conventional.. It's safer. It's a peculiar feeling, that of facing a man who holds your letter in his hand. If you don't measure up to the standard of your letter you're pretty sure to leave a bad taste in the mouth of your customer.

Are you a big, boisterous, happy-go-lucky, jolly sort of an individual? If you are for Heaven's sake don't write like this:

"Dear Sir:

"We have your valued favor of the 14th inst., requesting prices on the enclosed list of materials and in reply would say we cannot supply everything listed thereon but quote you below prices on those things which we can furnish," etc.

Readers who would like advice and criticism on their letters should send them along to the writer, care of Building Age. Perhaps our knowledge of advertising and letter writing may be of assistance, and ideas and suggestions may be exchanged. You with your knowledge of your business and customers must write the letter and the writer will go over it without cost and try to offer honest constructive criticism. All that we ask is that you send along sufficient postage to cover the return of your letter.

Address R. F. Duysters, Building Age, 243 West 39th Street, New York City.

Would you say that if you walked into this man's office? You would not. According to my way of thinking you'd walk in and say something like this:

"Good morning, Mr. Smith.

"Thank you for that letter asking for prices on materials you're going to use on that new contract you just closed.

"I'm glad you wrote me as you did because I've got a good stock of everything you want on hand with the exception of one or two things which I can get in a day or two.

"Just look over these prices and see if they don't measure up all right. Frankly, I don't think, Mr. Smith, that you can beat them and get good quality, etc."

Doesn't that sound more like you? If you sent this letter out in response to an inquiry and then followed it with a personal call would the recipient of the letter recognize the personality? I think so. Therefore once again, "Write as YOU would talk."

While we are on the subject let us just look at some advertising which has personality in every line. Have you ever noticed the advertising of Craige Ridgway & Son Co., otherwise known as "Hook'er to the Biler," Ridgway? This firm never employs any salesmen and probably never will as long as the "Old Man" is alive and able to turn out ads like the following:

"YOU OUGHT TO HEAR OUR CHOIR SING THE RIDGWAY STEAM HYDRAULIC ANTHEM.

"You can imagine what the music must be like when you see who are the artists.

"Here are the tenors—all great celebrities. (Here follows a list of well-known users.) Talk about Orpheus and his lute, talk about the Sirens that sat upon the shore, talk about all singers who have ever lifted up their voice in song—they are as crows to these steam hydraulic singers."

Here's another:

"IF YOU SHOULD EVER MEET 'OLD HOOK'ER TO THE BILER' and hear what he can tell you about his Steam Hydraulic Elevator, how those old engineering eyes of yours will pop open. "B'leeve Me!"

"Say, now honest Injun, Mr. Injuneer, do you think over 2000 of the biggest and best concerns in the land would be throwing out hydraulic electric and other elevators and replacing them with these wonderful Ridgway Steam Hydraulic Elevators—just for their health? Honest Injun now, do ya? That's why we laff! (Here follows a list of users and then:) 'Say, Old Tee Square, the greatest call on earth if you are smart enough to know it is our cry of 'Hook'er to the Biler.' "

I've never met the Mr. Ridgway that writes ads like that, ads that stick out among the others like a sore thumb. No, I've never met him, but doggone it man, wouldn't I be disappointed if I made the trip out to his home town and found a man cold in demeanor, who gave me a fishy, otherwise known as a limp, handshake and a cold stare? You bet I'd be disappointed and it would almost be as bad if I should write Mr. Ridgway and ask for information, etc., and receive in reply a formal stilted letter without a sign of punch, personality, or kindly humor. I'd think he was paying some one to write his ads—some one who knew a thing or two about human nature and I'd feel mighty disillusioned to get a cold, "take-the-joy-out-of-life" letter back. That's why I say don't pretend to be what you are not. It doesn't pay in the long run.

I've read a lot about studying the prospect—making a composite picture of the man you're going to write to—visualizing the customer, etc., all of which is good when linked up with letters that sparkle with personality. Remember a salesman can't change his personality for each call. He's just Bill Jones with the big laugh, loud voice, and hearty handshake. Bill Jones is disliked by some people. When he enters in that loud way it gets on the nerves of some buyers and Bill often gets two orders, one to get out and the other to stay out. But Bill is a good salesman. He makes, we'll say,

75 out of a possible 100 sales, which means that back home the boss says he wishes he had a few more like Bill and the wife gets a new dress and the kids eat regularly and every Sunday pile into the flivver and take a nice ride into the country.

Remember your letters are printed salesmen. Suppose you write 100 letters and 25 people out of the 100 don't like their tone and don't buy from you and the other 75 do buy from you, haven't you won out? And if you've been sincere in your letter if you've been natural and still these 25 are peeved at your manners would they feel peeved if you called on them? Yes, they would; and you couldn't sell them by personality any more than your letters would sell them. You can't please all the time; so just be natural and you'll get most of them.

Just another thing about those ads of Ridgway. Unless I'm greatly mistaken there's been quite a few people go out of their way just to meet the writer of those ads. They are like the small boy who took the clock apart to see what made it go. And what's more, when they came away they had a pretty good knowledge of what "Hook'er to the Biler" meant.

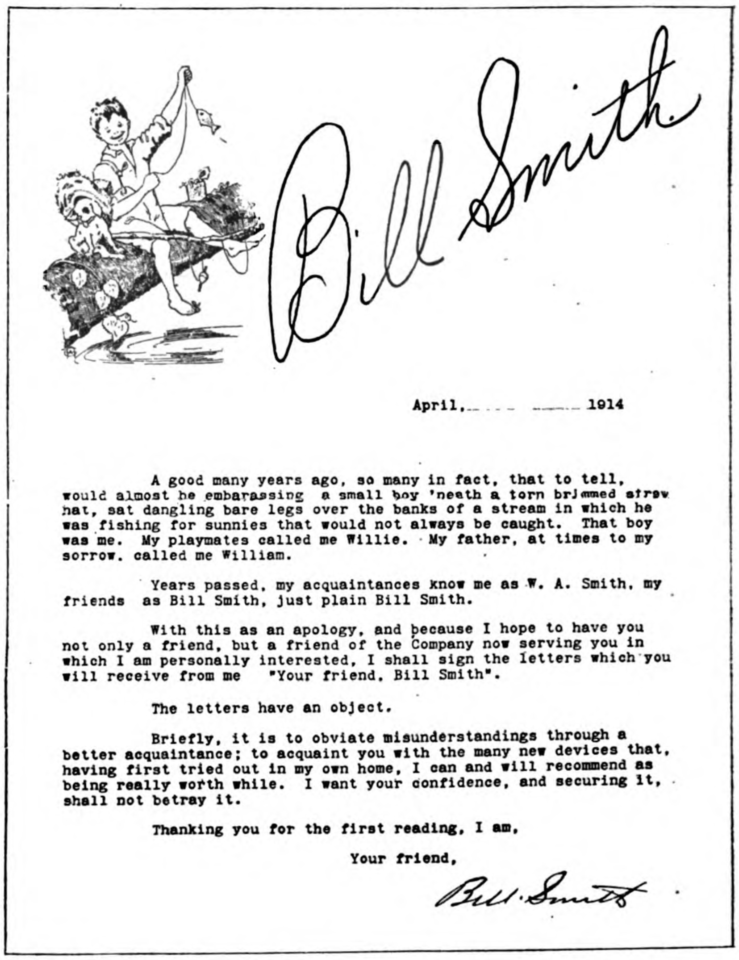
I know a printer who sent out a rather unusual letter. It pulled. He got a high percentage of replies, nearly all of which requested that he call. They wanted to see and talk to the man who wrote that letter. They saw and talked and placed an order, all of which means that the printer with his trade-teasing talk about typography had won out.

Personality and human interest should go hand in hand in letterwriting. Some years ago there was brought to my attention some literature, letters and circulars used by the new manager of a lighting company in the Middle West to build business and make friends. As this campaign was successful and may contain ideas which you may be able to adapt to your business I will review some of the ways and means.

The vice-president of the company, named William A. Smith, had some special letterheads made up with the name Bill Smith written across the top in script. As every letter was really written by Bill Smith himself this unique letterhead made them all the more personal. Bill Smith got busy and started a series of letters going to users of light as well as non-users. His first letter is shown on this page.

This was but the start and others followed in quick succession. Each letter was personal, timely and interesting. His letters brought a friendly atmosphere with them that radiated cheerfulness. For instance, in another letter, when thoughts of Spring were in the minds of his readers, he wrote them a letter saying: "Recently, while visiting for the first time one of our southern towns, I asked an old darky to direct me. The information was readily given and I had crossed the street when the darky called: 'Say, boss, don't yer reckon spring's on t' other side of der fence?' I replied that I thought it was. 'Well, boss, I sure's glad, 'cause I's tired of winter."

"Spring is here. The robins have come. The blue birds are again twittering their love song from the apple tree. 'Tis the time to plant that we may later reap. I therefore enclose a little package containing flower seeds. Plant in a two-foot space and watch them grow or give the commission to some of your little friends, telling them that Bill Smith would like to know what success they have."



Bill Smith

April, 1914

A good many years ago, so many in fact, that to tell, would almost be embarassing a small boy 'neath a torn brimmed straw hat, sat dangling bare legs over the banks of a stream in which he was fishing for sunnies that would not always be caught. That boy was me. My playmates called me Willie. My father, at times to my sorrow. called me William.

Years passed, my acquaintances know me as W. A. Smith, my friends as Bill Smith, just plain Bill Smith.

With this as an apology, and because I hope to have you not only a friend, but a friend of the Company now serving you in which I am personally interested, I shall sign the letters which you will receive from me "Your friend, Bill Smith".

The letters have an object.

Briefly, it is to obviate misunderstandings through a better acquaintance; to acquaint you with the many new devices that, having first tried out in my own home, I can and will recommend as being really worth while. I want your confidence, and securing it, shall not betray it.

Thanking you for the first reading, I am,

Your friend,

Bill Smith

Letter No. 1 of the Bill Smith Series

The next paragraph recommended the purchase of an electric stove and told how Mrs. Bill Smith seated at the breakfast table, had broiled the spring's first mess of mushrooms and served them on delicious "electric" toast.

Returns from this letter were most gratifying, for not only were many electric stoves sold but the seeds grew and many were the letters received by Bill Smith written in a childish hand telling of the growth of their flower gardens.

Each letter was not only personal and human, but it contained some good advice on seasonable topics, advice which was often used by mothers to advantage. One letter told them that "puffballs" were not poison but good to eat and explained how to cook them. Thus his letters were eagerly looked forward to by old and young alike, and warm was Bill Smith's reception when he called on his friends and customers.

The climax of human interest was reached, however, when Bill Smith allowed himself to write a couple of verses signed, "Your little friend, Bill Smith, Jr., per Daddy," for just a few days previous a new baby had come to bless the home of Mr. and Mrs. Smith.

I cannot help but believe that the progressive lumber and supply dealer will find much food for thought in the foregoing. Perhaps you've just put up a new silo or built a new barn for yourself or made some repairs to your home. If you handle paint, try some of it out, watch it and then you'll be able to write about it from experience and your letter will carry conviction. Some supply dealers claim things are pretty dull. All right; all the more time to punch a typewriter or build up a good mailing list

with all sorts of data about each man so that you can write a real letter that will get into his heart and eventually his pocketbook.

Letter writing is one of the most interesting and fascinating pursuits I know of and playing upon heart strings an inspiring, helpful, and healthy occupation. You, with your acquaintance and knowledge of your business, should be able to put it all over your mail order competitor.

When the Kaiser Called the Devil Up

Here's What He Had to Say

The Kaiser called the Devil up
On the telephone one day,
The girl at central listened to
All they had to say.

"Hello," she heard the Kaiser's voice.
"Is Old Man Satan home?
Just tell him it is Kaiser Bill
That wants him on the 'phone."

The Devil said, "Hello" to Bill,
And Bill said, "How are you?
I'm running here a hell on earth,
So tell me what to do."

"What can I do?" the Devil asked.
"My dear old Kaiser Bill,
If there's a thing that I can do
To help, I surely will."

The Kaiser said, "Now listen
And I will try to tell
The way that I am running
On earth a modern hell.

I've saved for this for many years
And I've started out to kill,
And it will be a modern job
You leave to Kaiser Bill.

My Army went through Belgium,
Shot women and children down;
We tore up all her country,
And blew up all her towns.

My Zepps dropped bombs on cities,
Killing both the old and young,
And those the Zeppelins didn't get
Were taken out and hung.

I started out for Paris,
With the aid of poison gas;
The Belgiums, darn them, stopped us,
And would not let us pass.

My Submarines are devils,
Why, you should see them fight;
They go sneaking through the sea,
And will sink a ship on sight.

I was running things to suit me
'Till a year or so ago,
When a man called Woodrow Wilson
Wrote to me to go more slow.

He said to me, "Dear Wilhelm,
We don't want to make you sore,
So tell your little U-Boats
To sink our ships no more.

We have told you for the last time,
So, Bill, it's up to you,
And if you do not stop it
You will have to fight us too."

"I did not listen to him,
And he's coming after me
With a million Yankee soldiers
From their homes across the sea.

Now that's why I called you, Satan,
For I want advice from you.
I knew that you would tell me
Just what I should better do."

"My dear old Kaiser William,
There's not much for me to tell,
For the Yanks will make it hotter
Than I can for you in Hell.

I've been a mean old devil,
But not half as mean as you,
And the minute that you get here
I will give my job to you.

I'll be ready for your coming,
And I'll keep the fires all bright,
And I'll have your room all ready
When the Yanks begin to fight.

For the Khaki boys will get you,
I have nothing more to tell,
Hang up the 'phone and get your hat
And hurry down to Hell."

—W. E. Curry in *Safety Hints.*

Tips from a Traveler

A Kink That Will Attract Attention to Your Business

By D. F. Ralph

WHEN traveling men get together in hotel lobbies and talk over their experiences there's an opportunity for an advertising man to get some good ideas. It is often a wise procedure to carry a little note book along and jot down some of these ideas, as they are easily forgotten if no note is made of them.

Lumber and supply dealers may be interested in the following publicity plan which, while perhaps not new, offers big possibilities. Many dealers spend a considerable amount of money on souvenir pencils, etc., which, though useful, do not create a great deal of comment. Get yourself talked about. Someone once said he didn't care what people said about him as long as they said something. The business man, however, wants only to create favorable publicity and here's one way you can do it.

Purchase, say, about 200 small balloons similar to those sold by venders to children. These can be had in quantity lots at a very reasonable rate if purchased direct from manufacturer or jobber. They are made up in such a way that your name and business can be printed on them so that when they are blown up your name will be prominent.

Publish an announcement in your local newspaper, and perhaps in those newspapers published in nearby towns, to the effect that on a certain day two weeks hence there will be a balloon ascension made from your grounds. Over two hundred balloons will be

let loose to the mercy of the winds, and on two of these balloons will be coupons which when presented at your office may be cashed for $5 each.

You, of course, can decide whether you wish to make it $5 or $10 or $1. Whatever you do, do not allow any distinguishable marks to be made on the balloons containing the coupons. It is further suggested that the ascension be postponed if there is not sufficient wind to carry off the balloons in a brisk manner.

This might be varied by attaching a real $5 bill to one of the balloons in the presence of the public and then going to the roof of your place or some high point and letting the balloons all go. Then, again, you might prefer to attach a coupon which will be worth $10 on any purchase made in your yard, etc. Various ways and means will probably suggest themselves to you.

This little scheme will undoubtedly make your company very much talked about and close attention will be paid to your advertising in the future in order that opportunity to make a little easy money may not be overlooked.

Publicity pays. Don't wait for someone else to try this out—be the first in your vicinity and deserve the title of progressive dealer.

How to Successfully Meet Mail Order Competition

Find Out What Advantages You Possess That the Mail Order House Does Not, and Concentrate Upon Them

By G. Ernst

IS mail order competition bothering you? Many dealers find it the one thorn in their happy business life. They believe that if such competition could be removed, the world would be a better place to live in.

There is only one way in which to combat mail order competition successfully. That is to emphasize and take advantage of the points wherein the local yard has undoubted superiority and to refuse to waste energy against the points in the mail order armor which are nearly invulnerable.

There are two main ways to combat mail order competition. The first is through price, the second through service.

Many dealers have successfully followed the practice of advertising that they will meet any mail order prices that may be quoted. This is being successfully and profitably done, but frequently an element of loss may be incurred. Should such loss occur, it is worth incurring, for the advertising value of offering to meet mail order prices is one of the best means of convincing the customer that the mail order price is not the lowest obtainable. Besides, there is always the very definite possibility of securing the customer's future good will and trade.

In comparing mail order prices with those of a local store, it is always necessary to remember that the local price usually is for delivery at the purchaser's required place. The mail order house merely shoves the material on a car, and sends it through collect. In addition, most mail order shipments are made for cash, while the local dealer is willing to extend a reasonable amount of credit.

This element of credit granting is one of the strong points which the local dealer can push. He delivers the material promptly, is on the spot so that any adjustments can be readily made with a minimum expenditure of time, energy and explanation, is frequently willing to take back surplus material, and altogether can give the consumer the right kind of service at the right time and the right place.

As regards price competition, there is no inherent advantage which the mail order house has which is not possible to the retail dealer. The mail order house is generally more efficiently managed, and its advertising is upon a more productive basis. The only advantage that the mail order house can possibly have is that it buys in large quantities, and thus secures the discounts which quantity purchases usually carry.

When a customer decides to give the local dealer a chance to quote on a bill of material in competition with the mail order house, the dealer has a first class opportunity to not only convince the customer that the mail order house is not quoting any more advantageous a price, but is also able to emphasize the kind of service that he is prepared to offer.

The local dealer can take the customer through his yard, show him the kind of stock that he is going to buy, talk up its good points, and emphasize the fact that it is all there, ready for delivery whenever the customer says so.

The customer can be told that he is able to buy the smallest quantity that he wants, just as readily as the largest quantity. He is not always able to do this with the mail order house.

In a small town the retail dealer is generally on friendly terms with most of his customers. If he is not, he should be. By right dealing, he can easily build up a clientele of friends and acquaintances whose good will is valuable, as they will form an army of boosters through the satisfied dealings that they have had with him.

The retail lumber dealer is generally in a better position than the mail order house to adapt his stock readily to local needs, to avoid slow sellers, and to hold trade by catering to any individual or neighborhood peculiarities that may be in evidence.

One of the greatest causes for failure in the retail lumber dealer competing successfully with the mail order house lies in his inability or unwillingness to advertise effectively. The yard should be kept looking neat, everything should be in its place, and the newspaper publicity should be of the best kind available. It is worth while looking over the catalogs of a few of the mail order houses which sell lumber and notice the flowery descriptions which they give, descriptions which the local dealer often thinks are silly, but which have the merit of selling goods, which the local dealer's ads do not always have. More than one dealer has decided to meet mail order competition by starting somewhat of a mail order business himself. He can best do this by extending his influence as far as possible among the people who come into contact with his store. His mail order service should primarily be a service to the people who generally buy the kind of material that he carries. Mail and telephone orders should be promptly attended to, and can be particularly requested. This is an advantage to the busy contractor, if the order is accurately taken.

Very often it is advantageous to issue a small list of specials for limited periods only, and this has the added merit of helping to move such lines as may be a little bit slow. Short lengths, special moldings, etc., can often be sold by booming the particular purpose for which they can be used.

The retail lumber dealer should always keep in mind the fact that although the mail order house may sometimes be able to undersell him, yet it cannot overserve

him. The very nature of the competition between the local man and the far away house gives the local man an inherent advantage which he is not always wide awake enough to seize upon.

Go after local trade, build up your personality and service, and study the mail order methods that are getting business. Adopt them to your own needs, and put your personal punch into them, which will make them more successful than the mail order house could ever hope for.

Is a Good-Looking Yard an Asset?

Here Is What One Dealer Did to Liven Up His Place

By C. E. Davidson

IT is an anomaly that retail lumbermen, whose business is so vitally related to beautiful buildings, "green swards and sylvan glades," have, in the past, had such poor offices and such unkempt lumber yards, and who permit the yards and the surroundings to present such a disorderly and unkept appearance. I am pleased to note of late, however, as the younger generation comes along, improvement here and there. Yes, some of the older ones have put in a new roller top desk, one or two respectable office chairs and a new glass front door. But in nearly all cases the sash and door stock is piled away in some upstair or out of the way place so that a prospective customer could not see the goods in the most advantageous manner.

Business called me to Collinsville, Ill., one day last week, and, of course, I called upon the enterprising firm of Peers & Gauen. Mr. Gauen was in and gave us a hearty welcome in a new office built of the celebrated Hy-Tex brick, made in that city. Upon entering his office I observed two dozen urns of flowers, evidently stored for the winter. I asked why the conservatory idea. Mr. Gauen explained to me that last spring he made up his mind "to doll up the place a bit," and had erected along the grassy plot along the curbing, just outside his yard, first some pretty concrete block pedestals about 30 in. high. On these he placed the urns filled with geraniums and other exotics. Of course he saw that the blue grass about was trimmed and the outside of the premises tidied up. The effect, he informed me, was wonderful. Everybody was speaking about the splendid idea of beautifying the street and, of course, all enjoyed the sweet-scented flowers. The idea took root and the result was that the neighboring merchants, not to be outdone, also put up the concrete pedestals or planted flowers along the space between sidewalk and curbing. Mr. Gauen informed me the effort well repaid the expense in appreciation of the public, and that next year he is sure more of it will be done about the city. A community interest was established.

Mr. Gauen, as a side line, with a civil engineer as a partner, contracts for all kinds of concrete work—builds sidewalks, bridges, etc. He has found it profitable and advantageous to his business.

Another thing. He says he would not do without a truck. A Ford with a form-a-truck attachment, costing about $750, "is just the thing."

Mr. Gauen is a close reader of BUILDING AGE.

AS SEEN BY THE MAN ON THE ROOF

THE NEW SETTLER

Village Blacksmith—Has that new house you built down on the flat started to settle?

Village Carpenter—No, and neither has the man I built it for.

IT ISN'T ENOUGH

It isn't enough the flag to fly,
It isn't enough to sing,
Enough to cheer when the boys go by—
For that isn't everything.
It maybe is fun
To curse the Hun,
To call him a tyrant tough,
But, ten to one,
Whatever you've done,
It isn't enough, enough!

It isn't enough to hope we win,
It isn't enough to pray,
It isn't enough till we all are in,
Till we all begin to pay.
Whatever we do
For the boys in blue,
The boys with the Yankee stuff,
Whatever we do
For the khaki crew,
It isn't enough, enough!

THE ONLY SURE CURE

The newcomer to the neighborhood dropped in at the building material yard in search of some advice and information.

"My neighbor's chickens keep coming over and scratching up my garden," he said, "and I want to ask you what is the best thing to keep them out."

The building material man put up a pound of shingle nails and handed them to the suburbanite.

"What do I build with these?" asked the man with the garden.

"You don't build anything with 'em," answered the dealer, "you shoot 'em."

NAMING THE BUNGALOW

They had just moved into the new six-room bungalow, but were undecided as to a name for it. They wanted something original as well as appropriate. *She* wanted to call it "The Cote," but *he* thought that was altogether too mushy. *He* wanted to call it "The Hangout," which *she* thought altogether too slangy. They never could agree about a name until a year later, when Harry and Carrie were born. Now everybody calls it "The Twin-Six."

ALWAYS AROUND

"The world is too much with us," said the preacher.

"Well," said the man in the back pew, "It hasn't anything on our relatives."

A man may know how to boss the building of a house but it takes a woman to boss the running of it.

CARRYING WEIGHT

When the shooting began the young colored person floated out through the window and, in so doing, carried with him the sash. Having done the mile and quarter to his cabin in something less than the record for that distance, he burst into the refuge, disentangled the encumbrance from his neck and remarked:

"Ah reckon ef it hadn't been foh that thah sash Ah'd a-done passed it!"

TURNING IT OVER

The young engineer, who thought that his duties would be the planning of fortifications, the blue-printing of enemy territory, and other things like that, had

now been engaged for a month in shoveling sand on the new railroad. He did it without complaint, but nevertheless——

One day his pal said, "There's one good thing about this European service—it gives a man a chance to see France."

"I know it," replied the young engineer, "but I didn't ask to see the under side of it."

THE KHAKI

You can't get away from the khaki,
You see it in every town—
In every street
Ev'ry moment you meet
With the boys who are wearing the brown.
The private, the captain, lieutenant
Are present wherever you go,
Accustomed to war
'Till a major no more
Will get us excited, you know.

You can't get away from the khaki,
You see it wherever you are—
A man with a gun
Who is after the Hun,
To give the old German a jar.
You'll find it camped down in the valley,
You'll find it camped up on the hill;
You can't get away
From the khaki to-day—
But neither can old Kaiser Bill!

ALSO WELL WORTH SEEING

It is a great thing for a man to have pride in his work.

"The Campanile in Venice is a wonderful and beautiful work of art," said the professor.

"Yes," replied the contractor and builder, "but have you seen those new six-room stuccos of ours in Lonesomehurst?"

THEN THEY WOULDN'T

"There ought to be some way of stopping these German spies from getting information in this country," said the indignant citizen.

"One way," suggested Citizen No. 2, "might be to compel them to confine all their inquiries to employes of the city building department."

MUTUAL

When a family moves into a new locality and wonders what kind of people live in that neighborhood, it is just as well for the family to remember that it isn't nearly as worried as the neighborhood is.

OBSERVATIONS

Some men who builded better than they knew didn't have to build so very well at that.

A lot of people laugh at the Englishman's h's and then call it "ashphalt."

If you want to know something about the high cost of building get a doctor to build you up.

It takes longer to drive a screw than it does a nail and to do most things that last long.

Thank goodness there is one kind of building going on in this country—an army.

There isn't any much greater joy in the world than driving the last nail in a good job.

It is all right to call a thing "cracking good," unless it is plaster.

The man who does work for less than it is worth is likely to do work that is worthless.

The electrician must be hard up; he is always wiring for money.

The man who won't take trouble is mighty like to make trouble.

The plumber may always be going back for his tools, but did you ever ask a lawyer for an opinion?

We have now come to the time of year when Cupid moves his office from the sofa to the front porch.

The man who tells an occasional lie is just as valuable as the roof that has an occasional leak.

Some way a fixture never throws the light just where you thought it would.

Unless you want to lose money the thing to keep is not only sharp tools but a sharp eye.

There is one coat that never looks well on a woman, and that is a coat of paint.

A man on a roof overlooks a lot of things, and so does a wise wife.

A tool can be so sharp that it makes cuts you regret, and so can a tongue.

We would be a healthy race if people would use more sleeping porches and use them more.

You can drive a nail by knocking but not a man.

New Publications

Cedar Chests, How to Make Them.—By Ralph F. Windoes. Red cedar is the ideal wood for chest construction and chests made of this material are popular throughout the country. The book under review shows practical methods of building cedar chests, and the matter is clearly presented. Illustrations include drawings in sufficient detail to afford adequate basis for working from, methods of making a chest dustproof, joints used in chest construction, etc. There are also a number of photographs of cedar chests, and perspective drawings showing the completed appearance of various styles.

The book has 69 pages, size 7 x 9½, is bound in cloth, illustrated, sells for $1, and is published by the Bruce Publishing Co.

Southern Yellow Pine, a Manual of Standard Wood Construction.—This little book, of a size that will slip handily into the pocket, is a compendium of technical information pertaining to Southern Pine. It contains valuable tables concerning Yellow Pine beams, safe loads in pounds uniformly distributed for various kinds of beams, sizes of beams, tables showing deflection of Yellow Pine laminated floors, safe loads for yellow pine columns, trussed beams, etc.

There is other valuable data, such as that concerning the holding powers of nails and spikes in Yellow Pine, general timber specifications, working unit stresses for Yellow Pine as required by various building codes, table of board measure, and other information that cannot help but prove valuable to the man who uses this material. An index makes the matter readily available. The book sells for $1, has 136 pages, size 4½ x 7, is bound in flexible cloth, and is published by the Southern Pine Association.

The Strength of Structural Elements.—By Ernest H. Sprague, A.M. Inst. C.E. This volume deals more particularly with those parts of structural work which depend upon the elasticity of the material, and embodies the application of the principles laid down and explained as regards to the design of simple structures in the author's former work "The Elements of Graphic Statics."

The book treats of principles involved in design, active and passive forces. The internal forces in a structure are analyzed, and various kinds of joints or connections in steel structures explained. The stresses and designs of composite beams, plate girders, struts and columns, continuous girders, etc., are explained. Considerable space is also devoted to the deflection of beams, oblique flexure, resistance of beams to bending, etc.

The book has 202 pages, size 4¾ x 7½ in., is fully indexed, bound in cloth, illustrated, and is published by Scott, Greenwood & Son, London. It is one of the Broadway series of engineering handbooks.

Practical Concrete Work for the School and Home.—By H. Colin Campbell, C.E., E.M., and Walter F. Beyer, C.E. This book has been prepared primarily as a workroom handbook for school shop use, and presents the principles of good prac-

tice upon which depends success in using concrete. The authors have consistently attempted to present the subject matter in such form as to be readily understandable. It is elementary in nature, and gives everyday information that is of interest.

The book describes the materials of which concrete is composed. The principles of form construction are explained, and tools and equipment for concrete work are described and illustrated.

The elementary principles of reinforcing are lucidly explained, and the proportions of concrete mixtures and the manner of mixing are gone into.

The use of concrete in connection with foundation walls, floors, tanks, posts, concrete blocks, etc., are all gone into in a simple manner.

The book is illustrated by photographs which show finished work, together with the methods of doing it, and drawings for designs of simple structures. The book has 164 pages, size 5½ x 8 in., is bound in flexible cloth, sells for $1.50, and is published by the author.

The Kiln Drying of Lumber.—By H. D. Tiemann, M.E., M.F. A technical knowledge of the various methods which can be efficiently used to dry lumber is obviously an asset to the dealer. It affords an adequate basis for the judging of the conditions of stock, and the liklihood of its being well adapted to the purposes to which it is intended to be put by the proper method of drying.

The book aims to give this knowledge. It treats of the structure and properties of wood, together with common practices in drying. The manner in which wood dries, with reference to its shrinkage, warping and casehardening, is described. The principles of kiln drying, together with the proper method of piling lumber to secure adequate circulation of air as aid to the drying, is pointed out.

Special problems in drying are taken up. Woods shrink differently in different directions, and in different portions of the same piece. Data on this subject is given.

Drying by means of a water spray humidity regulated dry kiln, together with drying by superheated steam and at pressures other than atmospheric, are gone into. An interesting chapter is devoted to theoretical considerations and calculations. Humidity, evaporation, density, amount of air and heat required, thermal or heat efficiency, etc., are gone into.

The different methods of drying have different effects upon the strength and hygroscopicity of wood, and this matter is lucidly dealt with.

It is advisable for the dry kiln operator to quickly determine the humidity conditions and vapor pressures, as well as the changes which take place with changes of temperature, in the drying of wood. A valuable humidity diagram is contained in the book, and is adapted to the direct solution of problems of this character without recourse to tables or mathematical calculations. The convenience of this is self-evident.

The author is well fitted to treat of this subject through his position in charge of the section of timber physics and the kiln drying experiments of the U. S. Forest Service. He is special lecturer in wood technology and forestry at the University of Wisconsin, and Forestry Products Laboratory, Madison, Wis.

The book is illustrated by photographs, drawings and tables. It has 316 pages, size 5½ x 8½ in., is bound in cloth, sells for $4, and is published by the J. B. Lippincott Company.

Making Advertising Pay.—By Harold F. Eldridge. Of interest to the inexperienced or prospective advertiser is this book upon the important subject of advertising. Its contents constitute an effort to place before merchants, business men, and advertisers, the basic principles upon which successful advertising must be built.

Numerous examples of advertising methods and stories of the experiences of successful advertisers are gathered together and presented in an interesting style. These records of actual accomplishment are accompanied by sufficient constructive criticisms to form a valuable basis upon which the reader can build his own advertising campaigns.

The book is divided into four sections, dealing with the economic and social side of advertising, advertising for the wholesaler and manufacturer, how successful retailers get results from advertising and analysis of the psychological task of advertising.

The book has 231 pages, is illustrated by reproductions of successful advertisements, sells for $1.50, is bound in cloth, and is published by the author.

Seasoning of Wood. By Joseph R. Wagner.

Upon the manner in which wood is seasoned depends much of the ultimate strength and availability of the finished timber. The need for economy and rapidity in kiln drying is bringing about a realization of the importance of this subject.

"Seasoning of Wood" is a practical treatise upon the subject indicated by its title. The author treats his subject fully, starting from the beginning by devoting several chapters to the various kinds of trees and their charactertistics.

Considerable space is devoted to a discussion of the enemies of wood, and data is presented showing how the trouble can be avoided.

The methods used in seasoning wood are well explained. Methods of kiln drying are discussed and various types of dry kilns fully described. A chapter devoted to helpful appliances is also likely to prove of interest as aiding toward more economical operation of the kiln.

A bibliography, glossary, index of Latin names of woods, and page index are among the convenient features of the work.

The book has 274 pages, size 6x9¼ in. 101 illustrations, is bound in cloth, sells for $3.00, and is published by D. Van Nostrand Co.

New Catalogs of Interest to the Trade

The Strongest Tile in the World.—Denison Fire-Proofing Co., Mason City, Iowa. Describes hollow tile manufactured by this company, together with valuable details of hollow tile construction.. The matter is contained in loose sheets printed on one side only and can be filed for future reference.

Better Building.—American Sheet & Tin Plate Co. Describes sheet metal for building construction, gives interesting data thereon. Contains pictures of residences and buildings on which metal shingles are used, plans and perspective drawings of farm buildings covered with corrugated roofing and siding, and other interesting information of a like nature. Directions for measurements and methods of application are given, together with a table of weights of roofing and siding products, useful information for builders and property owners concerning construction of tin roof, weights of roofing materials, wind pressures on roofs, and other miscellaneous information of interest.

Any of these catalogs will be furnished by the manufacturers. Or, if you prefer, we will see that you receive any that you desire. Just check the catalogs you want, tear out the page, and mail it to Building Age, 243 West 39th Street, New York.

Observations Upon the Atmospheric Corrosion of Commercial Sheet Iron; Particularly in Regard to the Influence of Copper and Mill Scale.—By E. A. Richardson & L. T. Richardson. Published by E. A. Richardson, 173 Savannah Avenue, East Cleveland, Ohio. Interesting article upon the subject indicated by its title.

The Evanston Sound-Proof Door.—Irving Hamlin, 716 University Place, Evanston, Ill. Describes construction and application of the sound-proof door manufactured by this concern.

Trussit.—The General Fireproofing Co., Youngstown, Ohio. Describes this type of expanded metal, together with line drawings and photographs showing its construction and appearance in the building.

Research on the Corrosion Resistance of Copper Steel.—By D. M. Buck and J. O. Handy. American Sheet & Tin Plate Company, Pittsburgh, Pa. Gives valuable data as revealed by research on the corrosion resistance of copper steel.

Corrugated Galvanized-Concrete Fence.—American Sheet & Tin Plate Company, Frick Bldg., Pittsburgh, Pa. Details of construction with drawings of fence with concrete posts and corrugated galvanized iron. Photographs of fences built this way are shown.

The Story of Steel.—United States Steel Corp., 71 Broadway, New York City. A concise story, profusely illustrated, of the mining, shipping and smelting of ore and coal and the manufacture of finished steel products.

Smith's Improved Panic Exit Locks.—Catalog No. 12. Frank F. Smith Metal Window Hardware Company, 81 Clay Street, Newark, N. J. Contains wash drawings showing construction and method of installation of various types of panic exit locks for use in theaters, schools, etc.

Waterloo Wall and Floor Register.—The Waterloo Register Co., Waterloo, Iowa. Describes and illustrates various types of registers, pipe fittings, chimney thimbles, coal chutes, etc.

Realflex.—The Western Conduit Co., Youngstown, Ohio. Description of an armored conductor for electric wiring in either new or old buildings.

Wisconsin Code for Rural School Privies.—State Board of Health, Madison, Wis. Describes and illustrates proper method of construction for privies used in modern schools where their installation is unavoidable.

Alpha Aids.—No. 10. Alpha Portland Cement Company, Easton, Pa. Interesting information concerning concrete construction. Contains photographs of buildings constructed of concrete. There is an interesting article on "Building with Metal Lumber." A supplement to this issue entitled "A Supplement of Suggestions on Small Houses" contains blue print reproductions of floor plans and elevations of concrete houses, suggestions on the placing of solid concrete steps on porch floors, economical method of constructing concrete walls, etc.

Richards-Wilcox Ideal Elevator Door Equipment and Checking Devices.—Richards-Wilcox Mfg. Company, Aurora, Ill. Describes and illustrates various types of elevator door hangers and equipment, together with line drawings, showing the method of installation.

Bigger Business Service for Retail Lumber Dealers.—White Pine Bureau, Merchants National Bank Bldg., St. Paul, Minn. Contains valuable hints showing how bigger business may be obtained by the lumber dealer, and advertisements that the dealer can profitably use to push his business.

Liquid Roofseal.—The Manhattan Paint Co., Cleveland, Ohio. Describes an asbestos roofing compound in liquid form, which is stated to have the advantages combined of both paint and cement. Describes the material and gives some idea of its manner of application.

Federal Traffic News, April 15.—A little magazine devoted to the interests of Federal motor trucks. This issue illustrates a number of trucks used in lumber operations.

Humphrey Gas Water Heaters.—Humphrey Company, Kalamazoo, Mich. A catalog describing and illustrating these heaters, together with details of operation.

Storm Hand and Electric Dumb-Waiters and Elevators.—Storm Mfg. Company, 40 Vesey Street, Newark, N. J. Describes and illustrates various types of dumbwaiters and elevators.

Screen Door Hardware. — Stanley Works, New Britain, Conn. Contains illustrations and descriptions of screen door hardware.

Protectorine Waterproofing and Dampproofing.—Charles E. Wood, Agent, 149 Broadway, New York. Describes this material, and gives method of application.

Woodworkers' Record, May. — Published by S. R. & M. Lewis, 1124 Wilson Avenue, Chicago, Ill. A monthly publication for complimentary distribution to foremen, superintendents, etc., of woodworking factories. Contains interesting information relative to stores, etc., as well as jokes and miscellaneous material.

One Man Can Run It. — The Little Whirlwind Mixer Co., La Crosse, Wis. Folder describing and illustrating the 1918 model of the Little Whirlwind concrete mixer, with hand and power drive.

Waterloo Cement Machinery Corp. Catalog No. 29.—Published by Waterloo Cement Machinery Corp., Waterloo, Iowa. The latest catalog of this concern, illustrating and describing wonder mixers, builders' hoists, woodworkers', trench pumps, backfillers, contractors' equipment, etc.

Marietta Spartan Art Wood Stains.—The Marietta Paint & Color Co., Marietta, Ohio. An attractively illustrated booklet which gives some interesting information upon the subject of stains and fillers.

Anchor Post Fences for Country Place, Factory or Farm. — Anchor Post Iron Works, 165 Broadway, New York City. This is catalog No. 51, and describes various kinds of fences manufactured by this concern.

Natco Homes for Workingmen.—Booklet containing various designs of houses, together with floor plans. These houses are intended to be built of Natco tile and are of various types and descriptions. It is devoted to giving general information concerning the construction of walls used in these houses. Each design is accompanied by a specification of the amount of tile needed.

Weir Heaters, Catalog No. 16. — The Meyer Furnace Co., Peoria, Ill. Describes and illustrates various kinds of heaters manufactured by this concern, together with some details of their construction and salient features.

Facts About Prepared Roofing and Asphalt Shingles. — The Prepared Roofing and Shingle Manufacturers' Association, Chicago, Ill. Gives data concerning roofing ordinances and various interesting information concerning prepared roofing.

Pomeroy No. 14, Galvanized Pressed Steel Fire Retardant Windows.—Bulletin No. 202. S. H. Pomeroy Company, Inc., New York City. Describes and illustrates counter-balanced and double-hung types of windows, also information concerning their construction and installation.

Truscon Building Products. — Truscon Steel Company, Youngstown, Ohio. Booklet giving practical building information, with a brief summary of the principal Truscon building products. The data is of an interesting nature and gives many valuable tables which are worth preserving.

Industrial Housing. Bulletin 172.—National Fire Proofing Company, Fulton Building, Pittsburgh, Pa. Gives data concerning industrial housing projects recently completed. Pictures and many floor plans are contained.

Sterling Furnaces, FB-52, Natural Air Heating.—Sill Stove Works, Rochester, N. Y. Describes and illustrates pipeless furnaces and other furnaces manufactured by this company. Contains photographs of houses which are furnished with these furnaces, and miscellaneous information concerning these furnaces.

Lighting Fixtures of Exclusive Design.—Mitchel Vance Co., Inc., 503 West Twenty-fourth Street, New York City. Describes Vanco bronze, called "The New Metal," and illustrates numerous types of attractive lighting fixtures.

"Watch Your Sand."—Kolesch & Co., 138 Fulton Street, New York City. A booklet describing the Universal sand tester, manufactured by this company. This booklet will be valuable to the user of concrete as enabling him to proportion his mixture to take advantage of any variation in sand.

Andes One Pipe Furnaces.—Phillips & Clark Stove Co., Inc., Geneva, N. Y. Booklet containing photographs of houses in which these heaters are used, together with testimonials. Contains miscellaneous information concerning the furnaces.

Doorways. June, 1918.—Richards-Wilcox Mfg. Company, Aurora, Ill. Monthly magazine, of which this number devotes considerable space to picturing attractive private garages.

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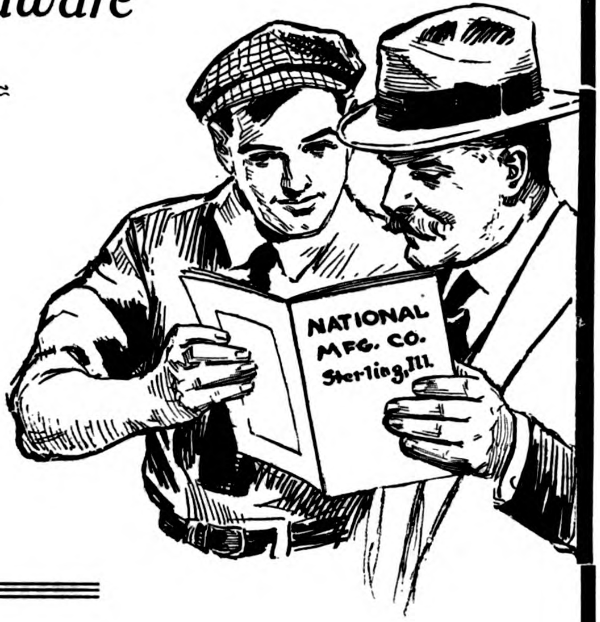

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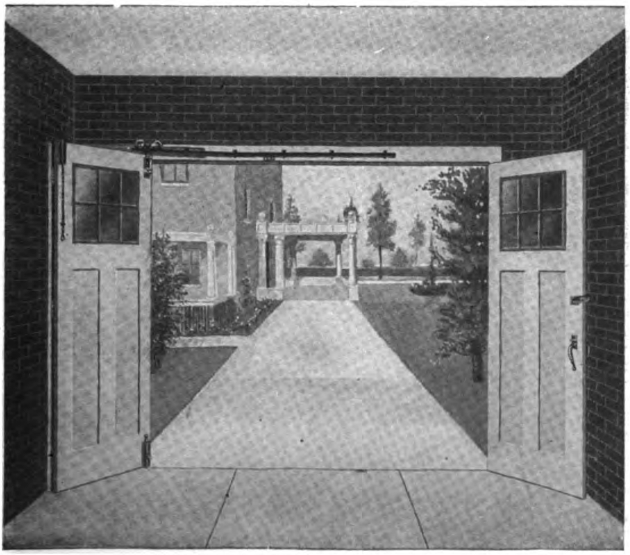

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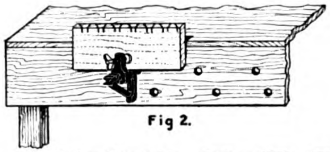

Fig 2.

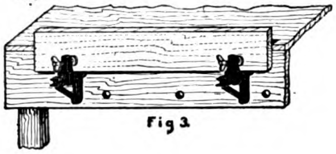

Fig 3.

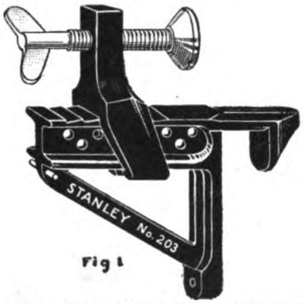

Fig 1

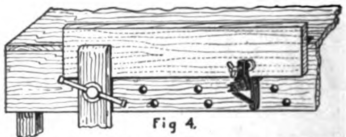

Fig 4.

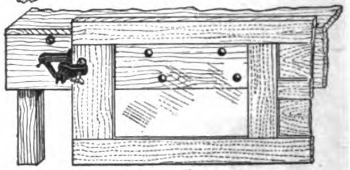

Fig 5.

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Fig. 3. For holding a long board (two brackets being used) where a bench vise is not readily available.

Fig. 4. For use in connection with a bench vise.

Fig. 5. For holding a door or window firmly in place while same is being planed to a fit, or mortised for lock or butts. The nail shown simply holds the bracket in a horizontal position.

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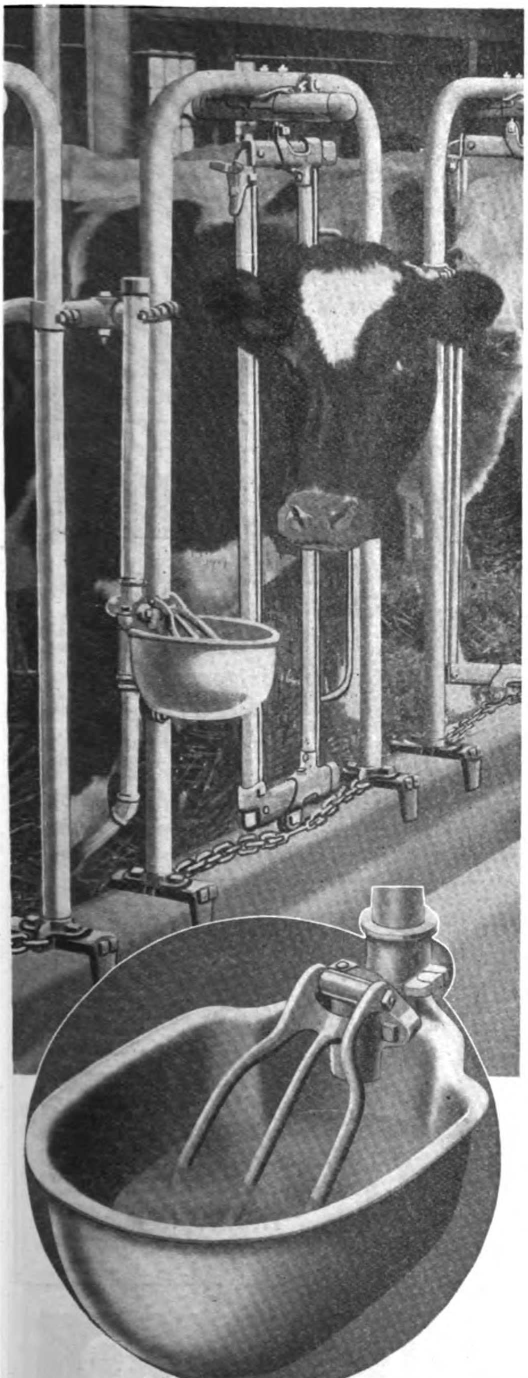

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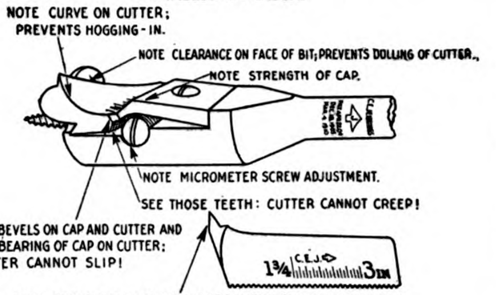
NOTE CURVE ON CUTTER; PREVENTS HOGGING-IN.
NOTE CLEARANCE ON FACE OF BIT; PREVENTS DOLLING OF CUTTER.
NOTE STRENGTH OF CAP.
NOTE MICROMETER SCREW ADJUSTMENT.
SEE THOSE TEETH: CUTTER CANNOT CREEP!
NOTE BEVELS ON CAP AND CUTTER AND 7/8" BEARING OF CAP ON CUTTER; CUTTER CANNOT SLIP!
C.E.J.
1¾
3 IN
NOTE TWO BEVELS ON SPUR, TO PREVENT CUTTER BREAKING.

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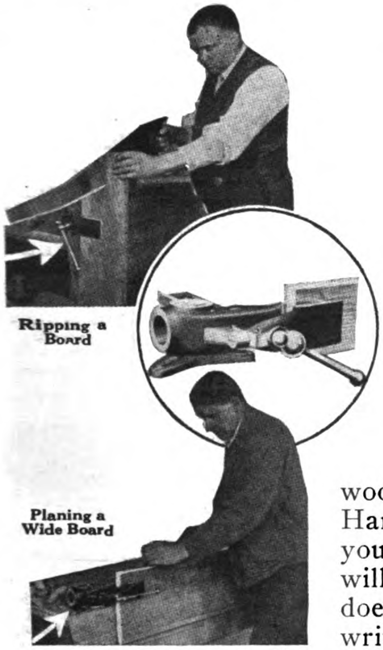

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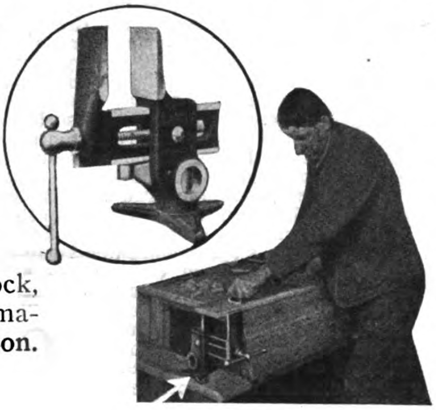

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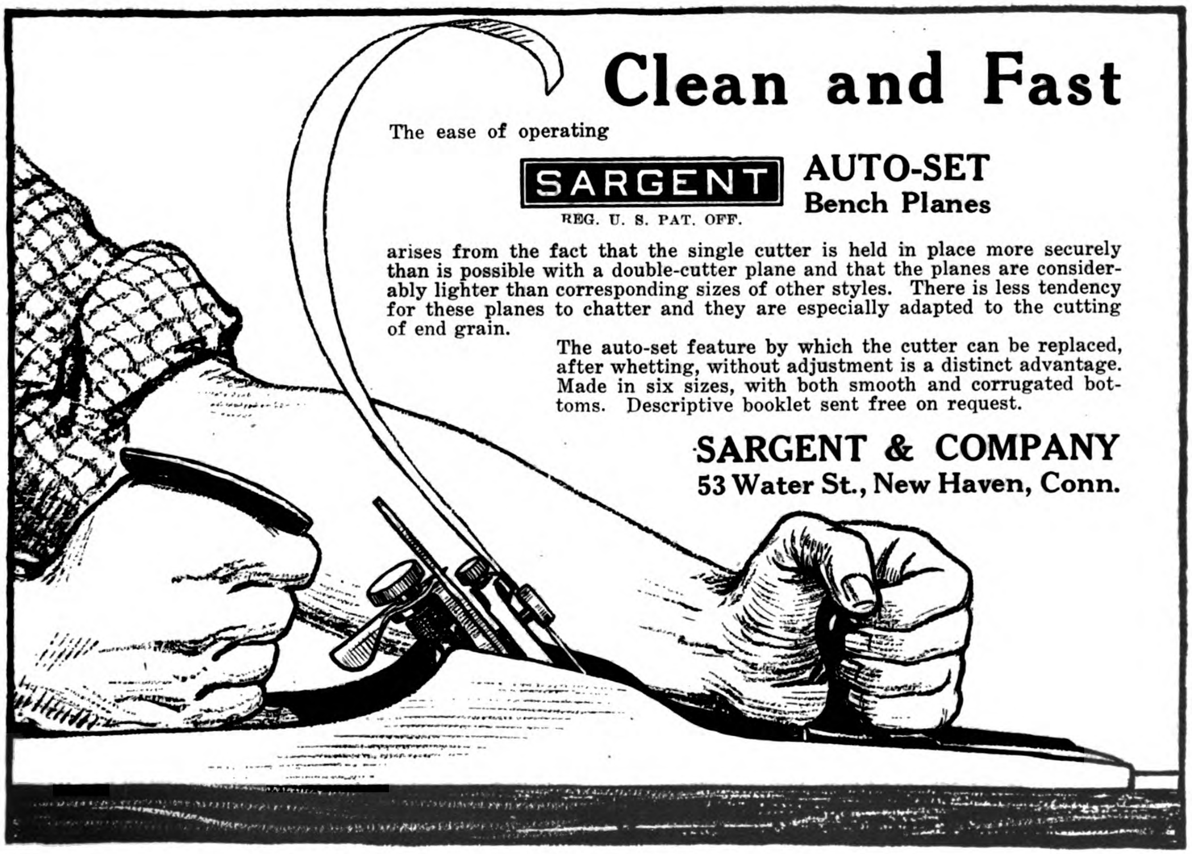

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BUILDING AGE

New York, August, 1918

A Beautiful Colonial House Built at Nepperhan Heights, New York

The wide porch, with its well proportioned pergola at the left, constitutes a delightful summer spot.

The dormer at the rear of the house is not easily visible from the front.

The stairs are hidden by the projecting fireplace, yet they are well designed and in keeping with the Colonial spirit of the house.

Houses have distinct individualities, and it is interesting to judge from looking at them what they express, and often what indication they give of the character of their occupants.

In the house illustrated here there is a great deal of charm and interest. Its broad, low lines make it appear to fit snugly into the high terrace upon which it is built, suggesting a haven and a real home for those who enter its hospitable doors.

Perhaps the greatest points of interest in the exterior of this little house lie in its unusual roof treatment and in the way that the wide clap boards are used in combination with the shingles. There is a real element of surprise in the roof of this dwelling. Viewing it from the front would lead one to believe that the rear section of roof fell in a long, unbroken line. But on the contrary there is a dormer of the same size and projection as that on the front of the house, with the same double row of shingles carrying back to the main roof at the cornice line. The clever way in which the severity of the end elevations is broken up is also worthy of note. The roof carries down to the top of the second story windows, making an overhang of some twelve inches at the head casing. This overhang is finished off with the same cornice that is used at the termination of the dormers, front and rear, and is at the same height that they are. Then, to form a break between the first and second floors, there is another roof projection running the length of the house and forming a triangle with the eaves of the main roof. The clever combination of wide clapboards with this unusual roof is also interesting.

Turning to the interior of the house, the plan has some valuable points to offer: One enters the living room directly from the wide, generous porch which covers the front of the house. This room is as spacious proportionately as the porch, being 24 ft. 6 in. x 13 ft. 6 in., and running the entire width of the house. The stairs, instead of being located near the front entrance, as is common practice in most small house design, are at the far end of the living room. In a

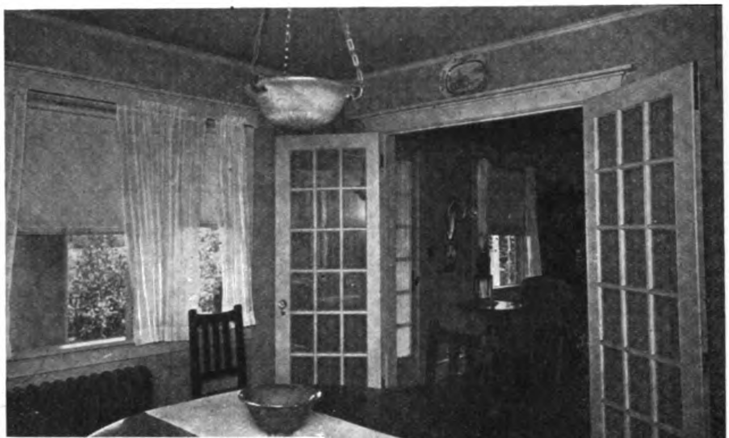
sense this is a very wise location for them, inasmuch as it means that no one can enter and get up to the second floor without passing through the major living portion of the house. A common landing serves for the living and service portions, there being three steps leading to it from the kitchen, as well as from the living room. This is a very desirable arrangement, since it obviates the necessity of the rear stairway and yet makes it possible for those in the kitchen to ascend to the second floor without being seen by those in the front part of the house.

Generous kitchen and pantry room are to be found here, with built-in cupboards and dressers. The basement stairs lead from the pantry and are as inconspicuous as possible—a point of considerable merit in such utilities.

Great economy is shown in the plan of the second floor. Four bedrooms, each with ample closet room, and a bathroom, are shown. Two of the bedrooms have two closets each, and there is also a closet for linen opening into the hall. It will be noted that very little space is wasted in this hallway.

As to the construction, after the earth under the walls was thoroughly tamped, stone footings 12 in. wider than walls and 12 in. deep were laid. Over the footings a stone wall was built, well bedded in cement mortar in a 1:3 mix. The walls and piers above grade were built of clean quarried stone, laid with a 1½-in. white mortar joint pointed up flush. The basement floor consisted of concrete composed of one part cement, two parts sand and five parts broken stone, applied 4 in. thick. A finish coat of cement 1 in. thick was applied on top of that.

The living room, looking toward the front door. Notice the high windows at the left, which give light and yet afford needed wall space.



The dining room is semi-separated from the living room by well designed doors.

A view of the front and right sides of the house. The flower boxes contribute much to the attractive and homey aspect which this house enjoys.

There is one only chimney in this house. It is builtup of sound, hardburned common red brick to the roof line; and the exposed portions are of a wire cut brick.

The framing throughout the building was of sound and well seasoned wood, in the following sizes: Sills, 4 in. x 6 in.; girders, 6 in. x 8 in.; joists, 1st and 2nd floors, 2 in. x 8 in., 16 in. on centers; joists, 3rd tier, 2 in. x 6 in., 24 in. on centers; Exterior and interior studs 2 in. x 4 in., 16 in. on centers; rafters, 2 in. x 6 in., 24 in. on centers; pergola and porch floor joists, 2 in. x 8 in., 24 in. on centers.

The first floor joists were set on 4 in. x 6 in. sills and the 2nd floor joists on 4 in. x 4 in. plates. The joists were doubled under all partitions running the same way, and all headers and trimmers were doubled. The girders in basement were constructed by spiking three 2 in. x 8 in. joists together, overlapping joints. All floor beams were cross bridged with 2 in. x 2 in. strips, 8 ft. 0 in. on centers. All openings over 4 ft. 0 in. had 4 in. x 8 in. headers, well trussed. Interior partitions were cross bridged with 2 in. x 4 in. The roof was tied with collar beams of 2 x 4, 5 ft. 0 in. on centers, with 2 x 4 uprights.

As sheathing, all roofs were covered with ⅞ in. x 2 in. spruce boards, spaced 5 in. on centers. First quality 18 in. red cedar shingles, laid 5 in. to the weather, were used on the roofs. The sheathing for side walls was ⅞ in. x 10 in. hemlock, surfaced one side, put on diagonally. A first quality waterproof paper, 6 in. lapped, was used under all stucco. A layer of Cabot sheathing quilt was put on, double-ply over the rough first floor.

All siding used for this house was of ⅞ in. x 10 in. red cedar; all corners mitered. The outside finish, including window trim, barge boards, porches, flower boxes, etc., were of good quality, well seasoned cypress, and all painted two coats of Atlantic white lead and linseed oil.

The overhang of roofs and soffits was ceiled with ⅞ in. x 6 in. double beaded N. C. pine, finished with a 4½ in. bed mould and 6 in. facia, and with a 4 in. crown mould for cornice. The porches were constructed of 2 in. x 8 in. floor joists 2 ft. 0 in. on centers, with a flooring of ⅞ in. x 3½ in. pine. The ceilings were of ⅞ in. x 6 in. double beaded N. C. pine, finished with a small mould.

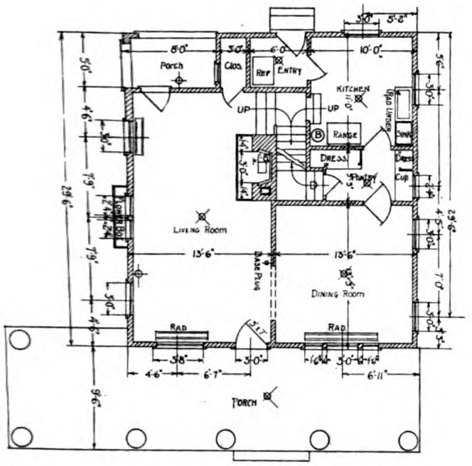
All windows and doors, except front entrance door, were glazed with first quality American glass. All windows are double hung, and of varying sizes, as will be seen from the drawings. Green shutters are to be found on all second story windows. The design of these shutters is worthy of note, primarily as showing the charming effects resulting from simple proportions, and secondarily as em-

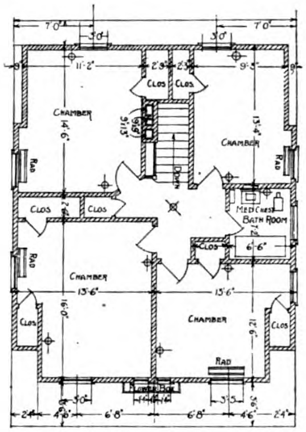
bodying the crescent design in the upper section.

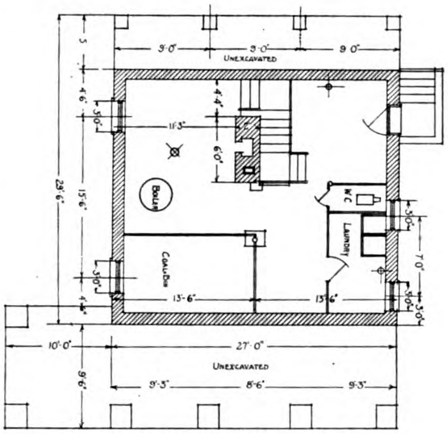
All interior trim was of white wood, painted three coats of flat white Atlantic white lead and linseed oil, with a little copal varnish in the final coat. The side casings are ⅞ in. x 4½ in., head casings ⅞ in. x 4½ in.. Windows have ⅞ in. stool and apron, with a small mould under stool jambs ⅞ in. thick. Base mouldings throughout the house are 8 in. high. Picture moulding was run in all rooms except dining room, kitchen and bath.

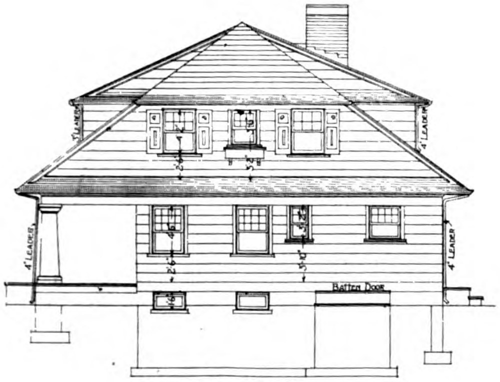
The interior doors were give one filler coat, one coat stain and were varnished and rubbed.

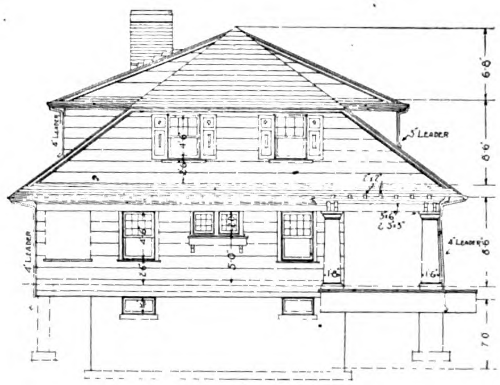
The walls, ceilings, soffits of stairs, and partitions on first and second floors were lathed with first quality spruce lath, spaced ¼ in. apart, run horizontally, with joints broken every tenth course. All walls and ceilings were given three coats—a scratch, a brown and a finishing coat; the first two coats composed of pure well-slaked lime, clean, sharp sand and the best cattle hair. The third coat was of a good hard plaster-of-paris finish.











Floor plans and elevations. Scale, ¼" = 1 ft. Note the compact and economical arrangement of plan. The kitchen entry, pantry and stair arrangement are especially worthy of notice.

The finished floor in living and dining rooms was of ⅞ in. first quality oak. All other floors, except bathroom, were of ⅞ in. x 2¼ in. first quality comb grained pine.

The main stairs were constructed on heavy carriages, rail or birch; 1 in. x 1 in. spindles, three to each tread. A newel post 5½ in. x 5½ in. was provided; risers were ⅞ in. thick, of whitewood; and treads were of oak, 1⅛ in. thick.

The cellar stairs were built on strong carriages with treads 1⅛ in. thick, no risers.

The fire place in the living room is of rough red brick, with ¾ in. white mortar joint flushed. Back lining and back hearth are of fire brick, and the front hearth is of smooth red brick laid flush with floor. A Jackson throat damper, No. 46, was installed, set in a wooden frame. The trap to ash pit was Jackson's No. 9; the ash pit has a Jackson's No. 12 clean-out door.

The house is wired with electricity, according to Fire Underwriters' specifications. Knob and tube wiring was run to all outlets, which terminate with steel outlet boxes. Steam heating, composed of a Richardson & Boynton boiler and American radiators was installed. The boiler was covered with 2-ply of asbestos and cellar-mains were given an asbestos air-cell covering.

This house was erected at Nepperhan Heights, Yonkers, N. Y., for Mr. J. W. Parker, in accordance with the plans and specifications of Philip Resnyk, architect, 40 West 32nd Street, New York City. Watson & Brunner, 58 Douglas Avenue, Yonkers, N. Y., were the general contractors.

Building Construction Necessary for Good Wallboard Work

Although Wallboard Can Be Used with Any Type of Construction, Yet Certain Essential Points Should Be Observed. This Article Points Out These Features and Tells How to Do a Good Job

By L. H. Harvey

Among the chief reasons for the present extensive use of wallboard is the readiness with which it may be employed with all kinds of construction. While it is a departure in many ways from former practices in wall and ceiling building, the sizes in which wallboard may be obtained as well as the manner of its application, permit its use without any material change in whatever general plan of construction may be adopted.

This is the case in either new work or remodeling over lath and plaster, brick, concrete or wood. But while the general principle holds true that wallboard can be used regardless of the type of building, there are a number of minor yet essential points the user of wallboard should be sure to observe if correct and completely satisfactory effects are to be obtained.

The drawings shown with this article illustrate, by sectional views, the proper application of wallboard. They explain where wallboard construction differs from usual practices and make plain the few precautions that should be taken to assure proper results.

Fig. 1 outlines the erection of a house from cellar to attic, giving each detail of the construction to show how little it is changed by the use of wallboard. There is of course no difference in the erection of the framework and outside walls and roof. The material difference comes in the complete elimination of lath and the insertion of headers.

The headers are made necessary by the fact that the four edges of each wallboard panel always should be nailed. Inspecting the panel design will show where the headers should be placed between the studs and joists. Headers do not have to be of any exact size or thickness. For this purpose 2 x 2's or 2 x 4's or odd pieces of similar size can be used.

The headers should be dressed on one side and placed so that they will come flush with the studs and joists. As a square, even nailing surface is always desirable, it is also a good plan to specify that the joists and studs should come dressed on one side. Fig. 1 shows how headers are placed for baseboard, plate rail, and where the walls and ceilings meet.

In the attic it will be observed that the two 2 x 4's which form the plate are used for the support of the top of the wainscot panels and the bottom of the sloping panels. The ceiling panels are generally nailed to the collar or tie beams, which looks better than carrying the panels clear to the ridge board and uses less wallboard. Headers are inserted between the rafters and the ties at the angle formed by the juncture of the tie beams and rafters.

This drawing also shows the construction of the inside partitions, where a stringer of 2 x 4 is placed on top of the sub floor and the studs are run up to the joists. The wallboard is nailed on both sides of the studs.

While this drawing shows the decorative strips in place over the panel edges, this trim and the baseboard are not applied until the wallboard has been painted. The decorative trim is stained before nailing in place. If two coats of paint are to be used on the wallboard, some builders prefer to apply the first coat to the panels before they are nailed and then apply the second coat after the board is on the wall.

Figs. 2, 3 and 4 show the application of wallboard in three types of houses that have the same inside construction as Fig. 1 but different outside walls. The drawings are made to show the application of wallboard on the lower portion of the side walls and illustrate part of the foundation. This plainly shows the insertion of headers and the placement of the panels back of the baseboard—a vital yet often overlooked precaution.

In Fig. 5, wallboard is shown in the cement or concrete block house. The inside wall should be given a good waterproofing coat before putting up the panels. It is necessary to fur the walls to provide the essential nailing surface for all panel edges and intermediate nailing. Wood plugs are driven between the blocks and the furring strips are nailed to the plugs.

The application over a brick wall is shown in Fig. 6. Pieces of 2 x 4, eight inches long, or the length of a brick are placed at intervals in the wall, which give

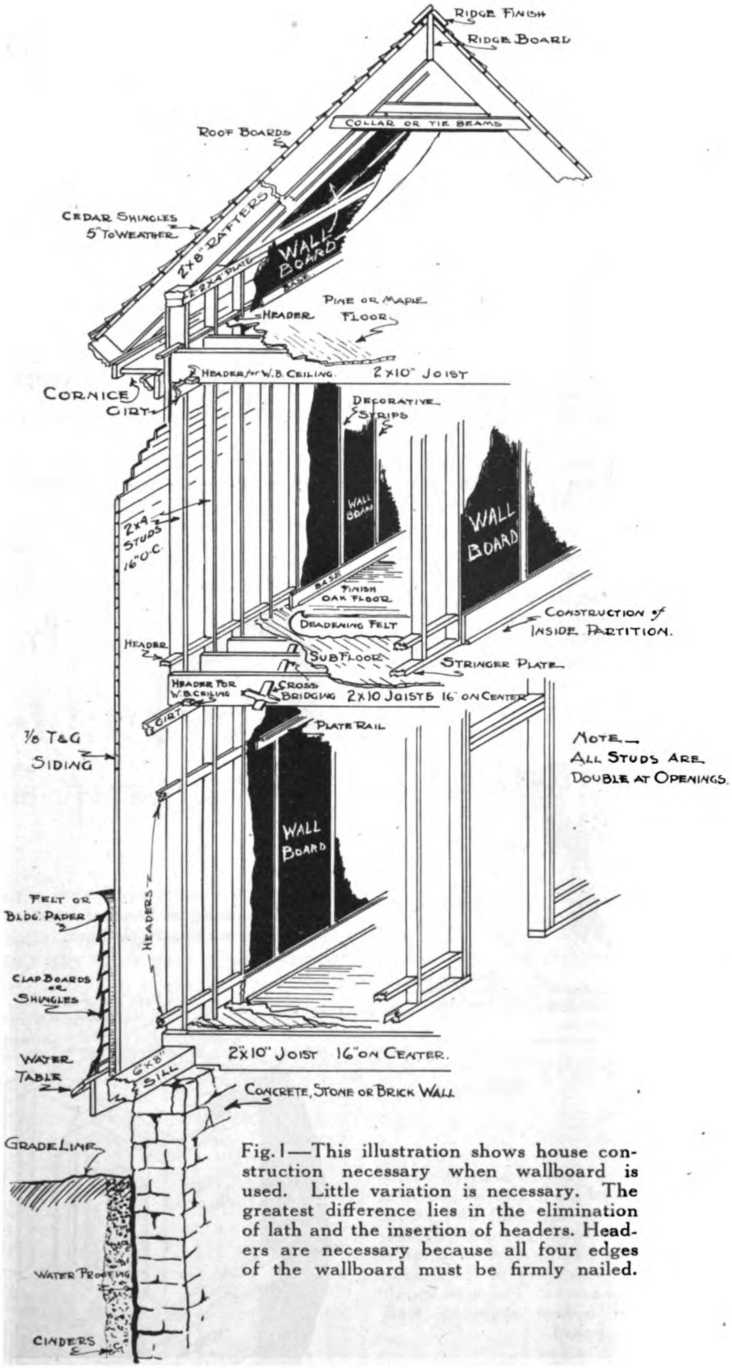
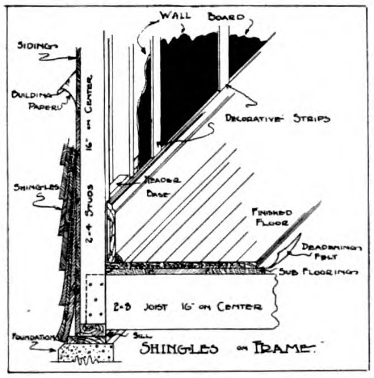


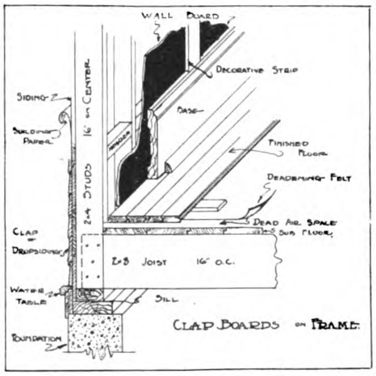
Fig. 1—This illustration shows house construction necessary when wallboard is used. Little variation is necessary. The greatest difference lies in the elimination of lath and the insertion of headers. Headers are necessary because all four edges of the wallboard must be firmly nailed.

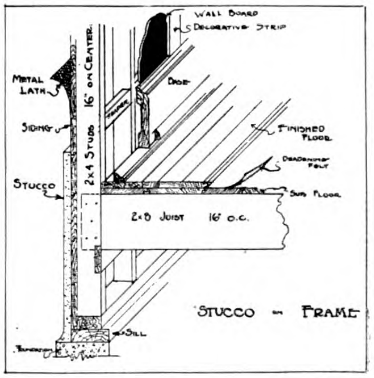
an excellent nailing surface for the furring strips. Another method is to insert an occasional wood strip between a row of bricks in place of the mortar. These strips can be of the same thickness as the mortar and the furring can then be nailed to the strips. The wall should be waterproofed before the wallboard is put in place.

If hollow tile is used on the inside of the brick wall, plugs can be inserted at the mortar joints to which the furring strips are nailed. An even better plan is to use one of the several patented clinching nail devices on the market for the purpose. There is a self-clinching wire nail, double-prong, which opens or spreads inside the tile as it is driven in, which prevents its pulling out. When used, however, it is necessary to drill a hole in the tile before nailing. In ordering the nails the thickness of the tile and furring strips should be given. The brick veneer house construction is shown in Fig. 7, but so far as the wallboard is concerned the application is exactly the same as in an all frame building.

These drawings have been made for new construction, yet there is practically no difference when using wallboard for







Figs. 2, 3 and 4 show how wallboard is applied in houses of the same general construction as Fig. 1, but with different covering for outside walls.

repairing and remodeling. The procedure for the brick and concrete of course is no different than for new buildings.

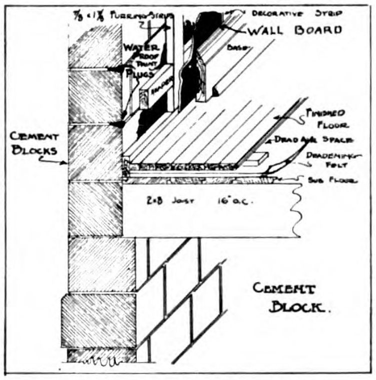


Fig. 5—Wallboard used in the cement block house. The inside walls should be given a coat of waterproofing before applying the wallboard.

Over lath and plaster, the panels can be nailed directly to the walls—no headers are necessary although the walls should be squared as much as possible and any large holes should be filled with scrap pieces of board. Over wood, ship-lap, or canvas covered walls no preparation is necessary.

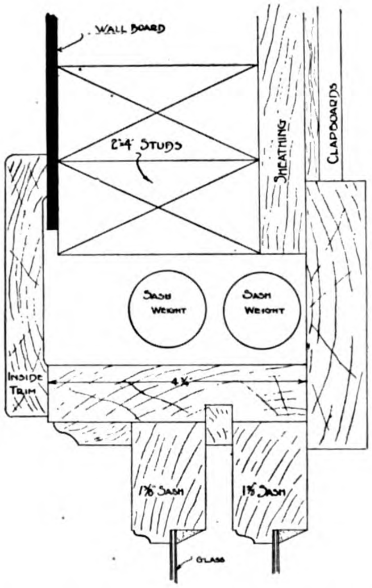


Fig. 8—Cross-section of window frame designed especially for wallboard.

Nailing details have not been taken up because they are now quite familiar to most carpenters. The instructions for nailing also are generally furnished with practically all wallboard, either on the back of every panel or included with each bundle.

There is one place, window casings, which should be given a little preliminary planning when wallboard is to be used. As wallboard is one-half inch thinner than lath and plaster, it is necessary to have the window frames made with that reduction.

Figs. 8 and 11 show the difference quite plainly. Fig. 8 shows a window frame made especially for use with wallboard while Fig. 11 is made for lath and plaster. Fig. 11, however, also explains how wallboard can be used with a lath and plaster frame by the insertion of a small strip, cut to fit, between the inside trim and above the ground. But of course this means extra work, so it is always advisable in ordering window and door frames to explain that they are to be used with wallboard and should be made accordingly. It is the custom of the mills to make these frames for lath and plaster construction unless otherwise directed.

Outside door frames are a half inch thinner with wallboard construction, the same as the windows, while inside partition doors are one inch thinner. This difference is due to the fact that wallboard is on both sides of the studs, thus reducing the thickness of the partition one-half inch on each side of the wall or one inch altogether.

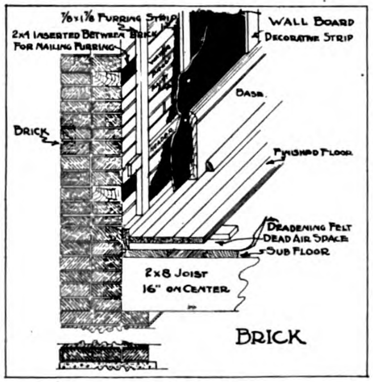


Fig. 6—Wallboard used in a brick-walled building. Pieces of 2x4, the length of a brick, are built into the wall and afford nailing base for the furring strips. Another way to get a good nailing base is to insert a wood strip, the thickness of the mortar joint, between the bricks. The wall should be waterproofed before applying wallboard.

Figs. 9 and 10 show two isometric views of the same construction. Fig. 10 shows the jamb and sill and also illustrates the fitting of the window sash, sill, stool, apron and casing.

The other isometric view shows the same window at the top with the window sash, head casing, etc. In both of these details it will be observed that the 2 x 4's are doubled on the sides as well as at the top and bottom of the opening, which should be done for strength.

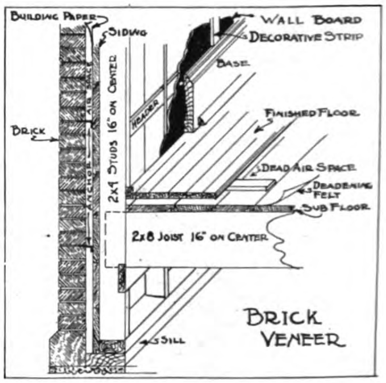


Fig. 7—A brick veneer house. The wallboard is applied exactly the same as in a frame house.

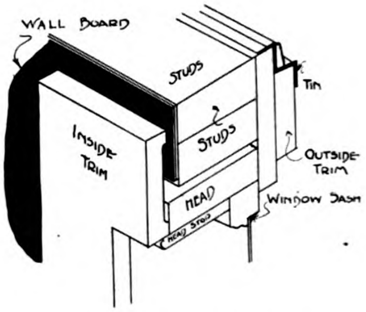


Fig. 9—Framing at head of window when wallboard is used.

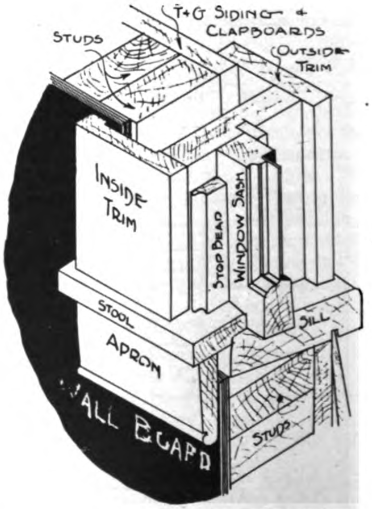


Fig. 10—Isometric perspective of jamb and sill of window when wallboard is used.

The detail, Fig. 11, shows the use of wallboard with window frames made for lath and plaster. The method

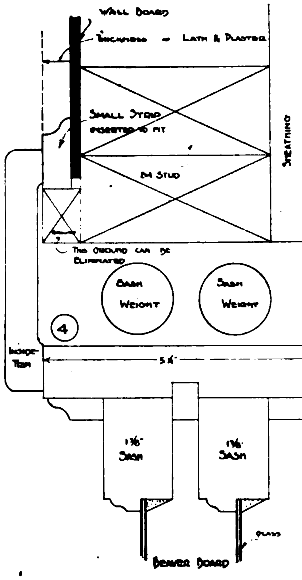


Fig. 11—This shows how wallboard can be used with a window frame intended for lath and plaster. A small molded strip, cut to fit, fills the opening between wallboard and frame.

shows the wallboard nailed direct to the stud and the insertion of the half inch strip. This strip can extend beyond the inside trim and be molded on the exposed edge, as shown, or it can be a plain strip which is brought flush with the casing. The ground, which is a sort of stop or level that the plasterers work to when applying plaster, can be left off when wallboard is used.

When remodeling or repairing over lath and plaster, the board should be applied around the casings according to the plan explained by Fig. 12. The wallboard is nailed right over the plaster, with a small space for expansion between the edge of the panel and the trim. Then a strip ⅝ by ⅝, or larger, is nailed against the casing to cover the edge of the panel.

Each builder of course has his own special "kinks" for using wallboard, as well as most other materials, but the points brought out here are the chief precautions that should be taken in order that the fundamental construction of a wallboard room may be observed. When these precautions are taken the builder can be satisfied that the board has been put up right—that it is a job in which he can take just pride.

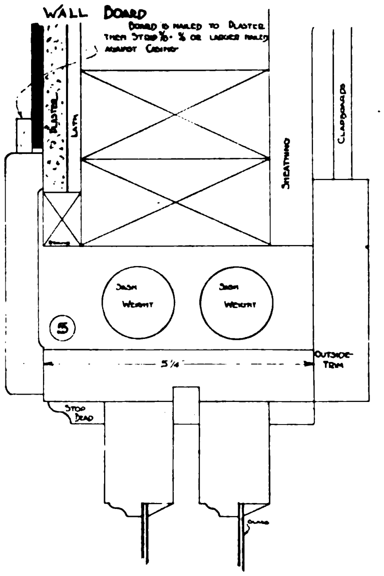


Fig. 12—Window detail when wallboard is used over old lath and plaster. A strip is nailed to cover junction of wallboard and trim.

Handy Table of Treads and Risers

This Article Shows How to Quickly Find the Proper Tread and Riser at a Glance for Any Stair

By W. A. Giesen, Architect

Stairs; they have caused more aggravation in house construction between architects, builders and owners than probably any other part of the construction. The usual difficulty seems to divide itself into two distinct parts: the size of the well and the amount of head room, i.e., the well is usually of a smaller size than is necessary to accommodate the stairs as laid out and the head room is

TABLE OF TREADS AND RISERS

No. of Treads or Risers	6 In. Rise ft. in.	6¼ In. Rise ft. in.	6½ In. Rise ft. in.	6¾ In. Rise ft. in.	7 In. Rise ft. in.	7⅛ In. Rise ft. in.	7¼ In. Rise ft. in.	7⅜ In. Rise ft. in.	7½ In. Rise ft. in.	7⅝ In. Rise ft. in.	7¾ In. Rise ft. n.	7⅞ In. Rise ft. in.	8 In. Rise ft. in.	8¼ In. Rise ft. in.	8½ In. Rise ft. in.	9 In. Rise ft. in.	9½ In. Rise ft. in.	10 In. Rise ft. in.	10½ In. Rise ft. in.	11 In. Rise ft. in.	13 In. Rise ft. in.	14 In. Rise ft. in.
1	6	6¼	6½	6¾	7	7⅛	7¼	7⅜	7½	7⅝	7¾	7⅞	8	8¼	8½	9	9½	10	10½	11	1 1	1 2
2	1 0	1 0½	1 1	1 1½	1 2	1 2¼	1 2½	1 2¾	1 3	1 3¼	1 3½	1 3¾	1 4	1 4½	1 5	1 6	1 7	1 8	1 9	1 10	2 2	2 4
3	1 6	1 6¾	1 7½	1 8¼	1 9	1 9⅜	1 9¾	1 10⅛	1 10½	1 10⅞	1 11¼	1 11⅝	2 0	2 0¾	2 1½	2 3	2 4½	2 6	2 7½	2 9	3 3	3 6
4	2 0	2 1	2 2	2 3	2 4	2 4½	2 5	2 5½	2 6	2 6½	2 7	2 7½	2 8	2 9	2 10	3 0	3 2	3 4	3 6	3 8	4 4	4 8
5	2 6	2 7¼	2 8½	2 9¾	2 11	2 11⅝	3 0¼	3 0⅞	3 1½	3 2⅛	3 2¾	3 3⅜	3 4	3 5¼	3 6½	3 9	3 11½	4 2	4 4½	4 7	5 5	5 10
6	3 0	3 1½	3 3	3 4½	3 6	3 6¾	3 7½	3 8¼	3 9	3 9¾	3 10½	3 11¼	4 0	4 1½	4 3	4 6	4 9	5 0	5 3	5 6	6 6	7 0
7	3 6	3 7¾	3 9½	3 11¼	4 1	4 1⅞	4 2¾	4 3⅝	4 4½	4 5⅜	4 6¼	4 7⅛	4 8	4 9¾	4 11½	5 3	5 6½	5 10	6 1½	6 5	7 7	8 2
8	4 0	4 2	4 4	4 6	4 8	4 9	4 10	4 11	5 0	5 1	5 2	5 3	5 4	5 6	5 8	6 0	6 4	6 8	7 0	7 4	8 8	9 4
9	4 6	4 8¼	4 10½	5 0¾	5 3	5 4⅛	5 5¼	5 6⅜	5 7½	5 8⅝	5 9¾	5 10⅞	6 0	6 2¼	6 4½	6 9	7 1½	7 6	7 10½	8 3	9 9	10 6
10	5 0	5 2½	5 5	5 7½	5 10	5 11¼	6 0½	6 1¾	6 3	6 4¼	6 5½	6 6¾	6 8	6 10½	7 1	7 6	7 11	8 4	8 9	9 2	10 10	11 8
11	5 6	5 8¾	5 11½	6 2¼	6 5	6 6⅜	6 7¾	6 9⅛	6 10½	6 11⅞	7 1¼	7 2⅝	7 4	7 6¾	7 9½	8 3	8 8½	9 2	9 7½	10 1	11 11	12 10
12	6 0	6 3	6 6	6 9	7 0	7 1½	7 3	7 4½	7 6	7 7½	7 9	7 10½	8 0	8 3	8 6	9 0	9 6	10 0	10 6	11 0	13 0	14 0
13	6 6	6 9¼	7 0½	7 3¾	7 7	7 8⅝	7 10¼	7 11⅞	8 1½	8 3⅛	8 4¾	8 6⅜	8 8	8 11¼	9 2½	9 9	10 3½	10 10	11 4½	11 11	14 1	15 2
14	7 0	7 3½	7 7	7 10½	8 2	8 3¾	8 5½	8 7½	8 9	8 10¾	9 0½	9 2¼	9 4	9 7½	9 11	10 6	11 1	11 8	12 3	12 10	15 2	16 4
15	7 6	7 9¾	8 1½	8 5¼	8 9	8 10⅞	9 0¾	9 2⅝	9 4½	9 6¾	9 8¼	9 10⅛	10 0	10 3¾	10 7½	11 3	11 10½	12 6	13 1½	13 9	16 3	17 6
16	8 0	8 4	8 8	9 0	9 4	9 6	9 8	9 10	10 0	10 2	10 4	10 6	10 8	11 0	11 4	12 0	12 8	13 4	14 0	14 8	17 4	18 8
17	8 6	8 10¼	9 2½	9 6¾	9 11	10 1⅛	10 3¼	10 5⅜	10 7½	10 9⅝	10 11¾	11 1⅞	11 4	11 8¼	12 0½	12 9	13 5½	14 2	14 10½	15 7	18 5	19 10
18	9 0	9 4½	9 9	10 1½	10 6	10 8¼	10 10½	11 0¾	11 3	11 5½	11 7½	11 9¾	12 0	12 4½	12 9	13 6	14 3	15 0	15 9	16 6	19 6	21 0
19	9 6	9 10¾	10 3½	10 8¼	11 1	11 3⅜	11 5¾	11 8⅛	11 10½	12 0⅞	12 3¼	12 5⅝	12 8	13 0¾	13 5½	14 3	15 0½	15 10	16 7½	17 5	20 7	22 2
20	10 0	10 5	10 10	11 3	11 8	11 10½	12 1	12 3½	12 6	12 8½	12 11	13 1½	13 4	13 9	14 2	15 0	15 10	16 8	17 6	18 4	21 8	23 4
21	10 6	10 11¼	11 4½	11 9¾	12 3	12 5⅝	12 8¼	12 10⅞	13 1½	13 4⅛	13 6¾	13 9⅜	14 0	14 5¼	14 10½	15 9	16 7½	17 6	18 4½	19 3	22 9	24 6
22	11 0	11 5½	11 11	12 4½	12 10	13 0¾	13 3½	13 6¼	13 9	13 11¾	14 2½	14 5¼	14 8	15 1½	15 7	16 6	17 5	18 4	19 3	20 2	23 10	25 8
23	11 6	11 11¾	12 5½	12 11¼	13 5	13 7⅞	13 10¾	14 1⅝	14 4½	14 7⅜	14 10¼	15 1⅛	15 4	15 9¾	16 3½	17 3	18 2½	19 2	20 1½	21 1	24 11	26 10
24	12 0	12 6	13 0	13 6	14 0	14 3	14 6	14 9	15 0	15 3	15 6	15 9	16 0	16 6	17 0	18 0	19 0	20 0	21 0	22 0	26 0	28 0
25	12 6	13 0¼	13 6½	14 0¾	14 7	14 10⅛	15 1¼	15 4⅜	15 7½	15 10⅝	16 1¾	16 4⅞	16 8	17 2¼	17 8½	18 9	19 9½	20 10	21 10½	22 11	27 1	29 2
26	13 0	13 6½	14 1	14 7½	15 2	15 5¼	15 8½	15 11¾	16 3	16 6¼	16 9½	17 0¾	17 4	17 10½	18 5	19 6	20 7	21 8	22 9	23 10	28 2	30 4
27	13 6	14 0¾	14 7½	15 2¼	15 9	16 0⅜	16 3¾	16 7⅛	16 10½	17 1⅞	17 5¼	17 8⅝	18 0	18 6¾	19 1½	20 3	21 4½	22 6	23 7½	24 9	29 3	31 6
28	14 0	14 7	15 2	15 9	16 4	16 7½	16 11	17 2½	17 6	17 9½	18 1	18 4½	18 8	19 3	19 10	21 0	22 2	23 4	24 6	25 8	30 4	32 8
29	14 6	15 1¼	15 8½	16 3¾	16 11	17 2⅝	17 6¼	17 9⅞	18 1½	18 5⅛	18 8¾	19 0⅜	19 4	19 11¼	20 6½	21 9	22 11½	24 2	25 4½	26 7	31 5	33 10
30	15 0	15 7½	16 3	16 10½	17 6	17 9¾	18 1½	18 5¼	18 9	19 0¾	19 4½	19 8¼	20 0	20 7½	21 3	22 6	23 9	25 0	26 3	27 6	32 6	35 0

RULE.—To find the number of risers in a given distance: Find the given distance in the table the top of the column will give the height of Risers and the first column will give number of Risers. The number of Treads are found in the same way.

inadequate. It is with the object in view of minimizing this disagreeable trouble and making it easier to figure the number of treads and risers of stairs that the table indicated as Fig. 1 was compiled.

With the use of the table the difficulties of laying out stairs and the chance of making an error in their calculations is as nearly eliminated as it is possible.

The table not only serves as an accurate guide but as a check as well, for in its use the architect, stair builder, carpenter and layman can at a glance and without calculation know exactly what size tread, rise and stair length can be placed in a given opening and height.

In laying out stairs a point to be remembered is the fact that the number of treads in each flight is one less than the number of risers, this being due to the landing not being taken into consideration as a tread.

Those who make it a business to build stairs know how the treads and risers should be proportioned, but for those who would lay them out and build them and have not been fortunate enough to know the method of obtaining the correct proportions of treads to rise the following information should prove useful.

There are several rules for determining the proportions between treads and risers for regular stairways, and upon which depends not only the appearance of the stairway but the ease with which it can be traveled.

Two of the most commonly used rules are hereinafter given with examples showing their application. The first one is the simplest and therefore most generally preferred.

Rule 1—Have the product of the tread and rise equal the number 66.

Example: Let us assume a riser of say 6 in. high, then the width of the tread will be $66 \div 6 = 11$ in.

To find the height of the riser the width of the tread can be assumed and the height of the riser found in the same way as the width of the tread was found.

Rule 2—To the assumed riser height in inches add a number to make the sum equal 12; double the number added and the result will be the width of the tread in inches.

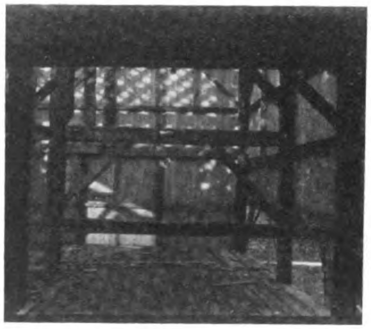
Example: Assuming that we want 7-in. risers, then $7 + 5 = 12$ and $5 \times 2 = 10$, which will give us the width of the tread in inches.

Using Second-Hand Lumber To Reduce Building Costs

Points on How To Handle and Buy It Efficiently

By George E. Walsh

With the national government discouraging new building that isn't an actual necessity during the war, the carpenter and builder must utilize his brains and resources more than ever to keep himself in employment. The chief reason for the government's attitude toward the building trade is its own great needs for lumber and nearly all kinds of building material, and it is anxious not to have any of this diverted from channels that will help toward winning the war.



The framing timbers, floor and roof joists and some of the shingle lath of this barn were of second-hand lumber. The barn was planned to make use of the second-hand material in the most economical way.

But the second-hand building material, which has been piling up in nearly every community for years past, can be made use of now in ways that will not interfere with government work. A great deal of such material is suitable for all sorts of repair and alteration work, and if handled with discretion the job can be made as good as if new lumber had been employed.

Here is an opportunity for the local builder or carpenter to put his talents to good use. The first problem is to convince the owner that second-hand lumber, properly seasoned and free from rot, is as good, and sometimes better than new lumber that has not been thoroughly seasoned. With more attractive prices for second-hand lumber, the builder should be able to do this.

There is, of course, always the difficulties that must be faced in using short lengths, which are bound to predominate in second-hand lumber. The matching of these short lengths so as not to give a patchy appearance to the job requires skill and study. Good pieces of full length boards may have to be cut off at each end to avoid slight splits caused by ripping them off the old building where nails clung tenaciously. But as a rule second-hand lumber piles consist of many good pieces which can be handled as well as new lumber.

Another point that comes up for attention is the painted surface of the old lumber. If painted dark, and the job must match some light tint, it is hardly wise to use the dark painted surface for outside work. The extra cost of painting to lighter tints will neutralize what is saved by using second-hand lumber. In many cases the difficulty can be avoided by reversing the boards, turning the painted surface inside, and exposing the unpainted face to the outside view. Burning or scraping off the paint may have to be resorted to in some cases. It will pay, however, to do this in a good job.

In spite of all care in using second-hand lumber some nail holes will be exposed, but if these are properly cleaned out and filled with putty they will not show in the finished work. Slight cracks can be treated in the same way. Where an otherwise good board is found, but shows a slight split at one end, a few thin wire nails driven edgewise into the lumber will remedy the defect, and make the work as good as new.

Second-hand lumber and bricks can be used for nearly all kinds of repair and alteration jobs, such as building a new or enlarging an old piazza, erecting storm vestibules, adding small sleeping porches, and even building a small addition or extension to the back of the house. In interior work that will be covered with plaster when finished the second-hand lumber is just as suitable as new.

The question of figuring on the cost of a job where second hand material is to be used is one not always appreciated by an inexpert builder. Accustomed to handling only new lumber of standard lengths, he can make swift and accurate estimates of the time and labor required for any job. These figures, however, do not apply in his present case. It takes longer to build with second-hand materials owing to the frequent cuttings and smoothing down of the boards, and the constant delays caused by good matching. One could not safely estimate on a job without adding at least ten per cent to the cost of new work. Usually it is safer to make an estimate on new lumber, and then add twenty-five per cent to it to make allowances for delays and extra work. One is pretty safe then in taking the job. Some go higher and add forty per cent, and in ordinary peace times they dislike to take such a job even then; but these are unusual times, and one must study the problem of utilizing waste in every possible way. There will never again be a better chance to get rid of the second-hand building pile than to-day. It should be the patriotic duty of every one to use the second-hand material for the duration of the war.

Of course, second-hand material of a high grade has gone up in price also, and it is not so easy to pick up a lot of material for a song. The success of the builder will depend a good deal upon his shrewd appraisement of the value of a pile of such material. It is generally all lumped together, and the owner puts in a price for the whole lot.

Before accepting such an offer, the builder should go through the pile and make a careful estimate of the actual amount of available material for his use. The number of good boards and bad boards should be roughly estimated, and also stock taken of the short lengths.

There is very little in such a pile that cannot be utilized in some way. One may not be able to use it all on the job in mind, but there are other minor jobs that may call for very short lengths. Therefore, in cutting the boards care should be taken not to waste or split the short ends. They may be just what you may need for the next job.

With pencil and paper go over the whole lot, putting down in one column the number of board feet of good lumber, and in another the amount of short lengths or damaged boards. By a little calculation in this way you can arrive at a fair valuation of a pile of second-hand lumber. Once this matter is settled you can make a bid for the job with eyes open, and come out with a good profit to your credit.

Usually dealers in second-hand lumber have nails withdrawn before it is piled up. If this is not the case you must offer a lower bid for it. The time required to extract nails will amount to considerable. This can be cheapened by employing a boy used to handling a hammer. By showing him just how to remove the nails with a minimum of damage to the boards you can save money. It hardly pays to employ high priced labor to do this work, or to do it yourself.

The same careful inventory of a pile of second-hand bricks will give similar good results. In a pile of second-hand bricks perhaps not more than three out of five will be suitable for rough work, and not more than one out of five of any value for first-class exposed wall masonry. Ends and sides are usually so badly chipped that they cannot be used except for rough work that does not show. Bricks salvaged from a fire are harder to judge than those torn down from an ordinary old wall. Sometimes the fire has disintegrated the bricks so they are ready to crumble, and will stand no pressure in a wall. They may look all right to the eye, but each one must be tested before it is accepted. This takes time and patience. Fire-injured bricks are therefore of little use except for filling in and for very rough work.

Second-hand doors and window frames must be considered individually. Few of them can be used without some additional strengthening and fastening. Many are out of plumb, and to get them back in the proper shape may require considerable labor. Paneling of doors may have to be renewed before they can be painted and used. Still it is remarkable what good effects can be obtained in second-hand doors by a little skillful carpentry and two or three coats of paint. If this is done in the workshop, and the doors taken to the building site when repaired and painted, few could tell them from new stock straight from the factory.

Building with second-hand lumber really requires more expert knowledge than using new lumber. Ingenuity and skill are demanded at every turn. It is a job for the builder himself rather than for the workmen, who will not as a rule give the proper attention. The average mechanic despises making over buildings with second-hand material just as the professional dressmaker hates to rip up an old dress to make a new one out of it. It seems to be a national characteristic. It is in line with our past lack of conservation methods.

But the war is rapidly changing our mental attitude toward such things, and during the war many will use old material who despised it before. The carpenter and builder who wishes to keep busy these days can therefore find no more fertile field than in the second-hand lumber market. It will pay to get hold of all of this material possible, and then make a canvass of the neighborhood for odd jobs. House owners have been deferring needed work on account of the war and high prices of material; but once convince them a job properly done now will save them money and they will listen. When the war ends, and the building boom begins, every carpenter will have two or three times the amount of work he can attend to. Not one will then listen to a job that doesn't deal with new lumber and new buildings. The time for repairs and alterations with second-hand lumber is now. Impress this upon house owners, and five jobs will appear where only one now seems to be in sight.

A Good Advertisement for the Builder

By Felix J. Koch

Next time you've a client whose lot your men clear, preparatory to starting building, and who doesn't mind your taking the cobblestones scattered over the surface there, set these aside till you've enough to build a fountain like that shown in the illustration. Then, at some season when trade's dull and men not busy, drop in on the president of city council, show him the snapshot herewith, and offer to erect a fountain like it on the city square, with compliments, of course.

Tell him how people, passing through, will stop, remark, patronize, and, going on, tell of it to others, sending these likewise. Coming, detouring, if but to see and use the clean little fountain; not alone to fill their autos, but to refresh thirsty throats themselves. They can't but note things in surrounding shop-windows, and patronize in turn. What is more, consider the advantage to man and beast of a pretty little fountain, the tap at side allowing folk to drink the water spurting in wee fountains from it; the gush below allowing the teamster to water his steed.

A thousand turns to one the offer will be accepted, the fountain being supplied from nearest pipe in the city street.

Naturally, in the building thereof, who's to hinder the insertion of a small slab stating that the gift is one made to the city by the Such-and-Such Co., Builders, the date cut just below?

Then, standing squarely in the highways, what such splendid and such permanent ad, and such cynosure of eyes of every passer, as this simple, inexpensive landmark; notably where built in the style of that of the picture, which is located in a cross-road at Aurora, Ind.

Some Echoes of the Noon Hour—XII

The Gang Gets in Touch with Some Rough Stuff That Livens Things Up

The man who had been fired came back soused to the gills, and the foreman stood it as long as he could and then acted with efficiency.

By Edward H. Crussell

There had been some little stir and excitement in the gang, caused by the advent (or rather the departure) of two new workmen. These men, working together, had been so careless and wasteful of material that the foreman had found it necessary to criticize their methods. His remarks being met with a rather insolent indifference, he had changed his tone and made them so much more emphatic that those concerned, declaring they would not take that kind of talk from anyone, packed up their tools and quit.

One of them, after filling himself with liquid courage, came back later with the avowed intention of making the foreman swallow his words. He made himself such a nuisance that finally the foreman, losing all patience, took hold of him by the shoulders, shook him till his teeth rattled, gave him a terrific slap with his open hand, first on one cheek and then on the other, whirled him around, ran him to the front of the lot and kicked him into the middle of the street. He landed on all fours, scrambled to his feet, took one look over his shoulder at the foreman (who was making as if to continue the attack) and departed from there with the speed of a scared rabbit.

The Boss tried to put up some second hand stairs. He and the foreman went to it like a couple of old washerwomen.

"Don't you come back here!" yelled the foreman, shaking his fist. "Don't come back here, or I'll give you something that'll make you wish you had died the day before yesterday."

The foreman came puffing slowly back and seated himself on a sawhorse while he recovered his breath. "I oughtn't to have been so rough," he explained, "but my wind isn't what it used to be and, unless I get away to a good start, I stand an excellent chance of losing."

"Yes," said Shorty, in an aside to the Kid, "I guess the Old Man must have been a terror in the days when his wind was good, but from what I've just seen I'd rather have tackled him then. He reminds me of my old dad. 'Come, now,' he used to say, 'hurry up! Hustle and get all that wood cut before your saw gets dull.'"

These events were being discussed the following day. "I wonder what it was the Old Man said to those fellows," remarked Bliss. "He doesn't usually let his tongue run away with him."

"No," said Farmer. "I've heard men who could cuss louder and use much worse language. At the same time," he continued, "I don't ever remember hearing one who could put more bite into common, ordinary, everyday words, or arrange them in better marching order.

"I only heard part of what he said to those fellows, but what I heard was a plenty. 'Any one who will waste material like that,' said he, 'is an enemy to this country and a friend of the Kaiser. I'm going to get a big iron cross for each of you. I never saw such work; if you had a doghouse to build on the corner of a hundred-foot lot there wouldn't be enough room on the rest of the lot for you to pile your waste lumber.' I don't wonder they quit. I believe I'd rather have a man swear at me than talk like that."

"You wait till the Old Man sees the hammer carving you've done on those basement stairs," said Scotty, "and perhaps you'll have a chance to take your choice. It'll be something for you to put in your card index."

There had been a good deal of this sort of squabbling in the gang during the past few days and to prevent it going further, Bliss interrupted with: "That remark of the Old Man's about waste lumber reminds me of an interesting item I read some time ago. Some fellow, who evidently had more spare time than he knew what to do with, had used part of it to figure out how many pieces went into an ordinary dwelling house. I don't remember his figures, but they ran unbelievably up into the thousands. He started in by counting the joists, bridging, flooring, etc., and went on up through the studding, siding and cornice to the shingles on the roof. I remember thinking at the time that if he was looking for numbers he was counting the wrong pieces. He should have counted the pieces that didn't go into the building, because for every piece that went in there were at least two pieces that didn't—the cuttings off each end."

"That's not so in the case of the shingles," objected Old George.

"That depends upon the quality of the shingles," was the reply. "We've had some bundles lately in which there were more pieces to throw away than there were to use, without considering any trimming at all. And if you are going to be particular I might argue that when we do trim a shingle we just as often trim off five or six pieces as we do two. The same may be said of much of the other woodwork."

"Yes," grinned Scotty, "take a stair stringer, for example; besides the pieces cut from the ends, there are the pieces cut out for each step, to say nothing

"I'll bet that condemned tinker of a section boss and his bunch of Wops thought they were unloading hay at a wreck."

of those that are sometimes knocked off it by careless nailing."

"For the tender love of Mike, Scotty," protested Farmer. "Your talk sounds to me just like hitting a sharp saw on a nail. You set my teeth on edge. If I were you, I'd quit talking about those stairs, or the first thing you know the fellows will begin to think you're sore because you didn't get the job of building them."

"All right," retorted the other pleasantly, "I'm willing to call it a day if you are. I get no pleasure out of that sort of thing. I've merely been trying to draw your attention to the fact that we are all of us human, and few of us get any satisfaction out of our fellow workmen's petty criticisms. Next time you feel like finding fault with any of my work count ten before you speak, and when you do speak—say stairs. A joke is alright in its place, but when it comes to picking flaws in each other's work, I think we had better leave that job to the Old Man, who gets paid for it, and who is, if I am any judge, better qualified to handle it."

"Returning to the first subject," said Bliss dryly, "I wonder if any of you ever saw all the lumber for a good-sized house gathered together in one place. Believe me, it makes quite a pile.

"As I think I've mentioned before, I spent one summer in the mountains, working for the railroad company building section houses. The buildings were lined inside with T. & G. sheathing instead of plaster, and it took four or five carloads of lumber for each one.

"The lumber all arrived at once and was unloaded by the section men, sometimes a month or more before we were on the ground. I remember one location where the ground was a slope of about forty-five degrees, so covered with rocks and boulders that there was hardly a flat spot to be found anywhere. The section boss had unloaded the lumber wherever he could find room. Some shingles here, some flooring there, some doors behind this rock and some window frames on top of that one. Every inch of ground within a radius of a hundred yards was covered with lumber pointing in all directions—north, south, east, west and straight up and down.

"Our foreman was a man who reminded me of Shakespeare's soldier—'Full of strange oaths and bearded like the pard.' The day we arrived he jumped up onto a rock, looked the situation over for a moment, and then said soberly: 'Well, by the roaring, red-hot flames of perdition! I guess there's some class to the brains that can take that mess and fit each piece of it into its proper place in the building. I'll bet that thoroughly condemned tinker of a section boss and his bunch of wops thought they were unloading hay at a wreck.'"

"From your description, Bliss," said Scotty, "I should imagine that all the material for one house, scattered around among a pile of rocks, would make an interesting sight. And sorting it out would be something of a puzzle. I haven't anything to beat that, but I believe I know something that equals it.

"I once worked for a fellow who made a practice of buying old houses, tearing them down and building new ones out of the pieces. The city had a street widening campaign on and this fellow bought a number of stone front dwellings in the better part of town (where the improvements were being made), tore them down and took the material out to the other end of town, near the iron works, where he built it into workmen's houses.

"Your material may have been pretty badly mixed, but I think we may assume that it had all been ordered the correct size and proper quantity. Also, the more of it you used, the easier it became to sort out the remainder. On the contrary, none of our material was the correct size in the first place, and the more we picked it over the worse it got and the harder it was to find a piece that would serve our purpose.

"I suppose most of you have used a little second-hand lumber at odd times, but can you imagine using nothing but it, day in, day out, from the start to the finish of the job? You may possibly think that we spent most of our time filing our saws, but we didn't. What's the use filing a saw, when the first stroke you take with it after it's filed will make is as dull as ever again.

"I stayed with the job for about a month, then one day, during a shower, I found myself prying rain spots out of a board with a chisel, so I decided to quit."

"I don't think I get you," said Shorty. "Why were you trying to pry out rain spots?"

"I thought they were tacks," explained the other with a grin.

Edward H. Crussell preparing to write one of the "Echoes." He is an old friend of our readers, and many will remember the worthwhile articles that have come from his pen.

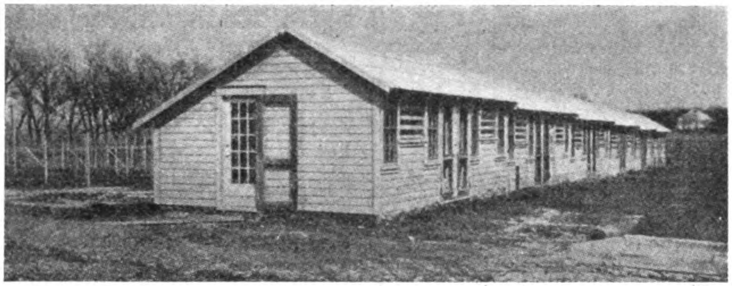
"There were some laughable things connected with this job," Scotty continued. "There were no plans or specifications of any kind, and all orders were by word of mouth. Changes and alterations were the rule, rather than the exception. Hallways were planned to suit a certain width of door, and partitions were moved over to suit a certain length of floor joist.

"The old fellow for whom we were working apparently fancied himself as a stairbuilder. The stairs in the old houses had been pretentious affairs, with curtail steps and continuous handrails. He was anxious to work them in, but as the new rooms were two or three feet lower than the old ones, some cutting down was necessary. He and the foreman figured on this for some time, changing the height of the second floor joists, like the kid changed his pinafore, three times in one morning.

"When it came time to put up the stairs, the boss undertook to do the work himself. He worked all afternoon on the job, taking first one of us to help him and then another, and the longer he worked, the bigger muddle he made of it and the more exasperated and excitable he became. Just about quitting time, he began to accuse the foreman of having made a mistake in the height of the ceiling. The foreman denied this, and they went at it like a couple of old washerwomen. Neither of them apparently knew any stronger word than 'gosh' or 'darn' and they were still trying to relieve their feelings with such words as these, when the rest of us quit for the day. Next day the boss didn't show up at all, and in his absence, the foreman fixed up the stairs. Each step had a little slope to the front, but he explained that he thought that would make them easier to go up and down."

"Stairs! Stairs! Stairs!" said Farmer to the kid, as the whistle blew and they departed for their places. "Scotty's got stairs on the brain!"

A Scientific Henhouse Built for Convenience and Efficiency



Expensive fencing for yards on south side is unnecessary where the birds are mated during the breeding season only and infertile eggs are produced the remainder of the year. The fencing bill of this plant was saved $400 by this plan.

Essentials in a Henhouse Which Bring Efficiency to the Egg Layer

By M. E. Dickson

To build a poultry house and build it to meet the requirements of the hen under constantly varying climatic conditions, and with no protection of artificial heat for winter or natural shade for summer, is a problem that must be dealt with scientifically. Ventilation is the most important factor in the construction of all poultry houses. The body of the fowl is so constructed that it can stand neither too much cold nor too much heat. As in the dog, the body gases are mostly thrown off by respiration. Breathing is rapid, and large volumes of air rich in oxygen are necessary.

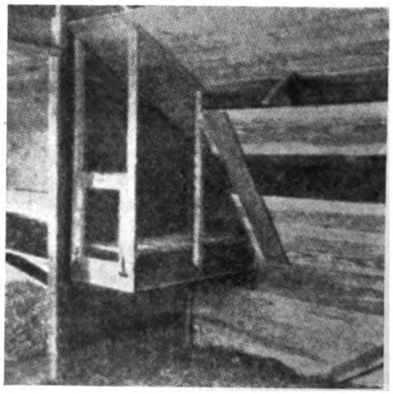
The hen, an egg machine, requires the highest type of efficient housing and general care. She is working constantly. The grinding of her feed continues at night, and throughout the day she is busily gathering more. At night she goes to roost with a full crop. Efficient lighting of her working quarters is essential for her to do her best. All parts must be equally lighted in order that the floor space allotted to each fowl may be utilized.

To construct walls for warmth in winter and coolness in summer is an absolute necessity for eggs at these times. The north, east and west walls should be built tight for winter, but for summer they must not remain so. Ventilation must be provided.

Convenience and arrangement of interior fixtures so as not to interfere with floor space or lighting, and to be properly proportioned to the size of the flock, is another problem. Ventilation in such a house is accomplished in a way as to prevent any possible drafts striking the birds. A wooden baffler is constructed in troughlike fashion. Each baffler is V-shaped, and to prevent drafts one fits over the other. All windows are on the south side. Each window consists of two sashes, both easily removed, and the upper is so constructed as to fall back into a specially made slot of triangular shape.

In this instance they are made of galvanized iron, but can easily be made of wood. Any draft that may enter the windows is then forced up next to the roof, thus preventing sudden chilling of the birds on the floor. A constant temperature is ideal. Any appreciable variation one way or the other should be guarded against; but at the same time there must be a certain amount of circulation throughout the pen. Baffler ventilation, with window ventilation, can meet this demand.

Each pen is 14 ft. square and accommodates 50 females and three males; is 7 ft. to top of plates on south side and 5 ft. on the north. Solid wooden partitions, boarded to the roof every 14 ft.

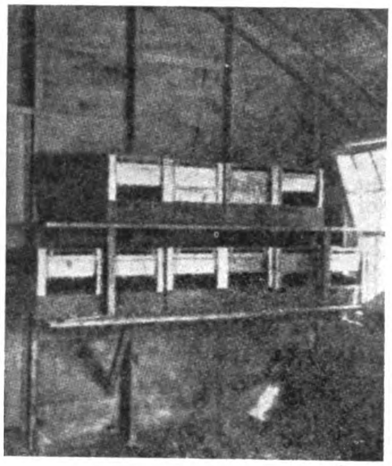


The hens cannot roost on the perches during the day. The droppings board and perches are hinged to swing up out of the way.

divide the pens. Double-action doors lifted to swing 8 inches off the floor to clear the litter, with a removable board beneath for cleaning convenience, are used. The location of the door is best nearer the north wall than the south. This, then, at all times allows the birds the floor space on the south side, which they prefer to that of the north and which they use most.

A feed house is not necessary in connection with this poultry house. Each pen contains its storage hoppers. The grain hopper is 5 ft. long and 15 to 20 in. deep, and holds approximately 500 pounds, an amount sufficient to last the pen a month. The mash hopper holds 500 pounds of dry mash. It is built in. All hoppers, nests and droppings boards are placed two and a half feet off the floor. This allows the fowls full use of the floor space. The water stand, grit and shell hopper are next to the window. The entire north side is taken up by the roosting space and broody coop. The droppings boards are hinged to the wall, and the supports for the perches are likewise hinged so that both may be swung up out of the way.

That does away with the chickens' roosting on the perches during the daytime. The brackets supporting the boards are also hinged to swing inward and are out of the way. The opening below the boards is for ventilation and extends to a similar opening on the outside wall. Each pen has its broody coop convenient to the nests, where broody hens may be quickly and easily put in jail. Trap nests are used; one is allotted to every five hens. Scantlings are done away with to support the roof. Partitions are used for this, and the trouble from hens roosting overhead is done away with.—*Country Gentleman.*



Trap nests are used; one is allotted to every five hens.

A Rat-proof Corn Crib Saves Money

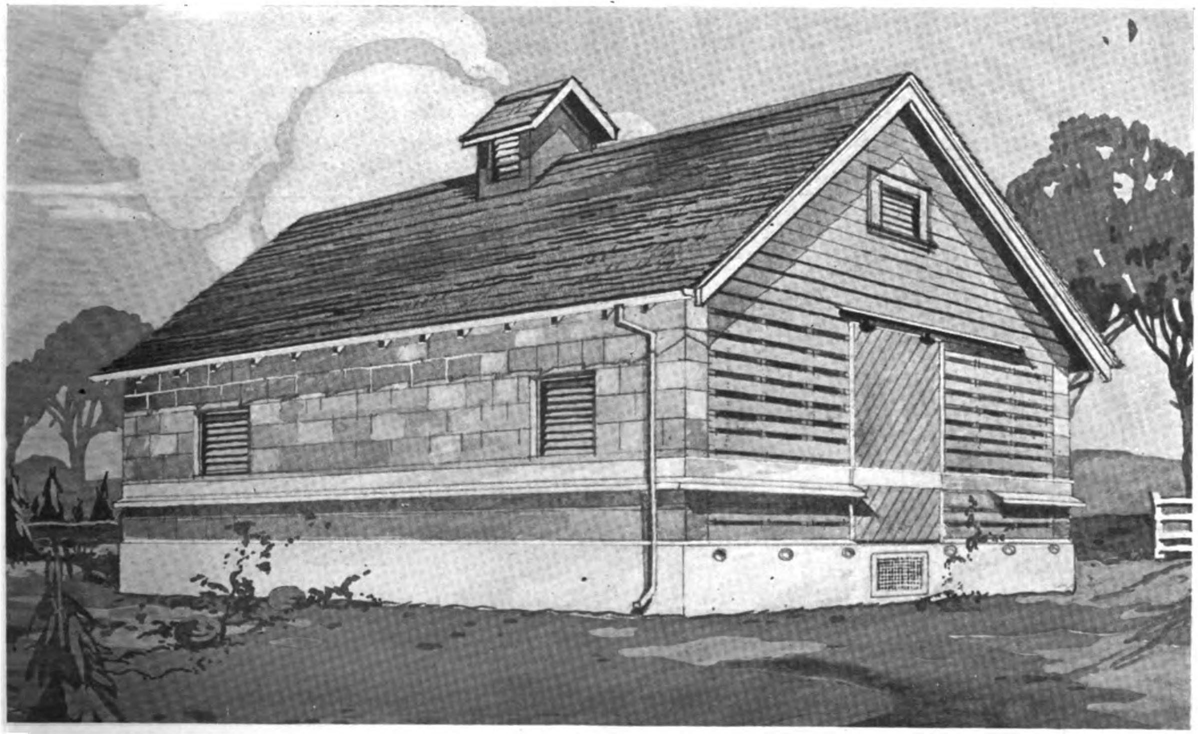
This Article Gives Bill of Materials and the Necessary Details to Build One of Hollow Tile

By Frank T. Fellner, Architect

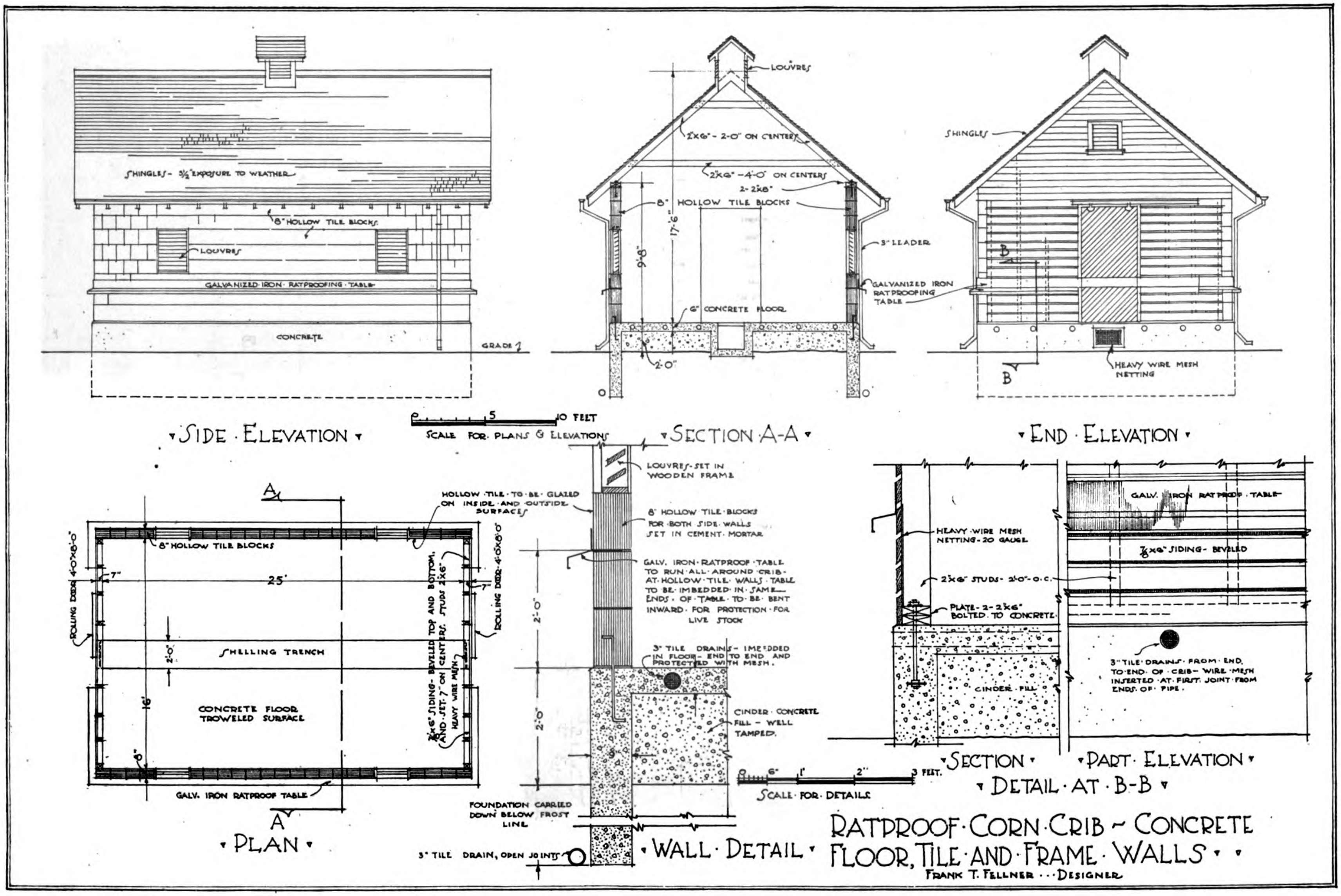
This corn crib is constructed of hollow tile and frame with a concrete foundation, floor and shelling trench, with both ends of frame construction for ventilation. With the side and ridge louvres it forms a modern ratproof method of cribbing corn.

This crib has an approximate capacity of about 1500 bushels of green corn, and would appear about right for many farms.

The main superstructure walls are



The farmer is a good prospect for new business. Help him to modernize his farm and make it more efficient by constructing good buildings for him.



RATPROOF · CORN · CRIB ~ CONCRETE FLOOR, TILE · AND · FRAME · WALLS · ·

FRANK T. FELLNER · · · DESIGNER

composed of side walls of hollow tile blocks 8 in. in thickness, glazed on both sides, thus making the walls impervious to moisture. Frame walls are at both ends, and the roof is frame, covered with shingles.

This type of corn crib is applicable to practically every section of the country.

Care must be taken in setting the foundations for a structure of this type. Footings should be spread footings as shown, lined up plumb and true.

Excavation for foundation should be carried down below frost line. Foundation footing is of concrete, 9 in. wide.

The foundation is constructed of concrete, 9 in. in thickness, in the proportions of one of Portland cement, two of sand and four of broken stone. Foundation walls are carried up 2 ft. 6 in. above grade line, as shown, and finished off level and true, with wire rods ⅜ in. in thickness and 2 ft. 6 in. in length, and set in concrete to carry up between joints of first course of hollow tile.

Rat proofing table is carried entirely around crib, 9 in. in width, as shown, with heavy mesh, 20 gauge carried up on inside of siding up to rat proofing table.

Earth within crib is graded level, and 24 in. of gravel set, forming a bed for concrete floor, which is 6 in. in thickness, same aggregate of concrete materials as foundation. Three-inch clay tile drains are set in this concrete floor to drain away all moisture.

The walls are composed of 8-in. hollow tile glazed, set in cement.

Reinforcing rods of ⅝-in. thickness are set in blocks over openings to crib and filled with concrete to form lintels. End walls are of frame. Studs are 2 in. by 6 in., 2 ft. on centers, with ⅞ in. by 6 in. siding, beveled top and bottom.

When the structure walls have been carried up full height, 1-in. bolts, 2 ft. 6 in. long, are imbedded in hollow tile, with anchor pieces at bottom. The projection 6 in. top takes plate which is composed of two 2 in. by 8 in. yellow pine pieces bolted together.

Roof rafters are 2 in. by 6 in., set 2 ft. on centers and tapering toward apex of roof. A large wooden ridge ventilator, 2 ft. 6 in. in width, is set in the top of roof and roof framing is framed for same.

Rafters have a projection of 1 ft. 6 in. over edge of roof and are covered with 1-in. thick sheathing nailed at every bearing. Sheathing boards are covered with building paper and finished with shingles, slate or asbestos shingles, laid 5½ in. exposure to the weather.

Should it be preferred, roof can be constructed of corrugated metal on an angle iron frame, forming a corn crib practically fireproof throughout.

Doors to be batten doors, of frame, tongued and grooved boarding. Doors to be 2 in. in thickness and swing on overhead track.

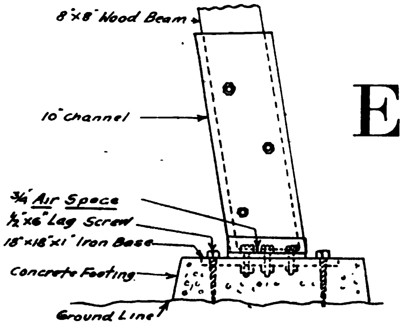
ESTIMATE OF MATERIALS

Concrete (foundations, footings, etc.)	20 cu. yd.
Hollow tile walls	520 cu. ft.
3-in. drain tile	160 lin. ft.
Cinder concrete fill	30 cu. yd.
2 in. by 6 in. studding (rafters, etc.)	1100 lin. ft.
6-in. beveled siding, for both ends	900 lin. ft.
1-in. sheathing for roof, etc. (spaced with 1-in. wide joints)	700 lin. ft.
Shingles (5½ in. to the weather)	5 bundles
Reinforcing and anchor rods, etc.	70 lin. ft.

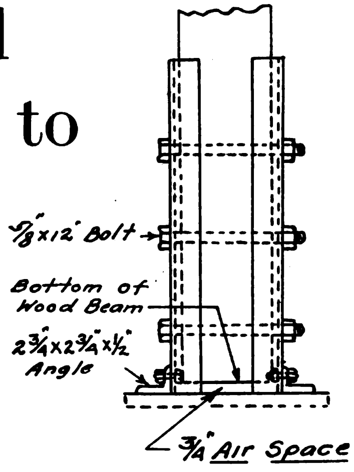
A Practical and Economical Way to Build a Trestle

The Poles Are Set So As To Secure Maximum Durability

By A. G. D.



The manner of fastening the posts at the foot which secured durability. Note the ¾" air space.

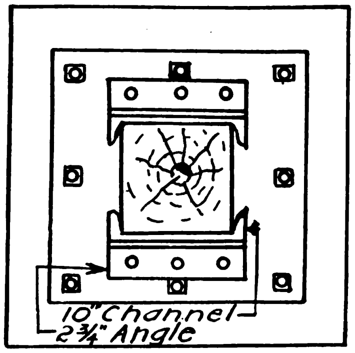


Detail of Foot of Post.

I describe herewith a method of setting beams for a telpherway or trestle, which was used by a practical carpenter. This first came to my attention about three years ago, and I thought at the time it was surely almost universally used. I began to notice structures of the same sort, several trestles, an automobile speedway, coal elevators from the river, all places which were suitable for it, and have not seen one other. It may possibly be one of the old tricks of the trade which have been forgotten, but even if this is so, its success in this case warrants it being recalled.

In 1900 a telpherway was erected by a street railway company for the purpose of conveying coal from the railroad cars to the bunkers over the boilers. The uprights of the structure consisted of 8 in. x 8 in. wood beams inclined inwardly from the vertical about 10 deg. Most of these joists were set on concrete footings about 2 ft. square, extending 6 in. above the level of the earth, as follows:

The telpherway extended east and west. On the east and west side of the beam was bolted a piece of standard 10-in. channel, 38 hundredths of an inch thick, 2¾ in. flange and 2½ ft. long. These channels were placed with the flanges turned toward each other, thus forming a sort of casing around the beam. They were fastened by three ⅝ in. bolts, 12 in. long, staggered about 9 in. apart, running through the two channels and wood beam, thus really supporting the beam by a clamping action.



Plan of the Base.

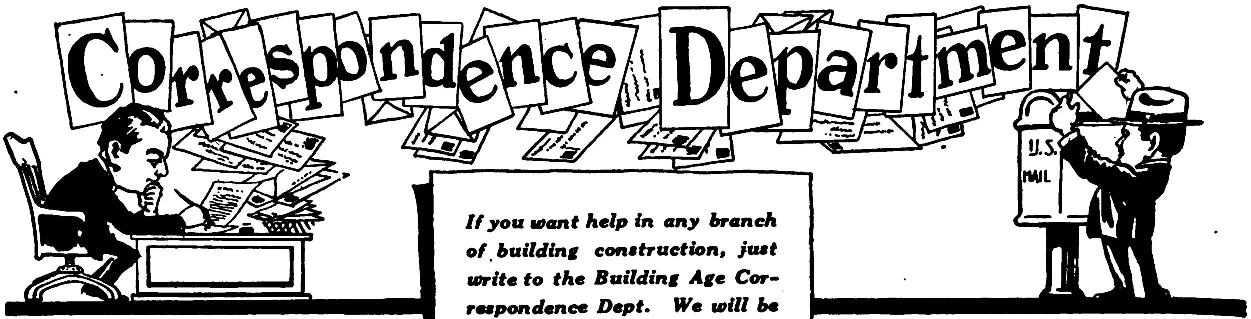
The beam and channels were drilled for the bolts before erection, and the holes in the beam were so located that when placed in position the bottom of the beam was three-quarters of an inch above the base. The base consisted of a flat iron plate, 18 in. square by 1 in. thick, set flush in the concrete footing

when it was cast, and secured by eight ½ in. by 6 in. lag screws, about an inch from the edges. The channels were bolted to the base by means of 2¾ x 2¾ x ½ in. angle irons 10 in. long.

The advantage of this construction lies solely in the three-quarters of an inch air passage between the bottom of the beam and the iron base, thus allowing any accumulated moisture to evaporate rather than travel up through the heart of the beam with the attending rot. For some reason or other six of the original posts were not so placed, but set flush without the air passage. These posts have all been renewed three times, due to heart rot. A short addition was made to the telpherway about ten years ago, and without the air space these posts have been renewed—again heart rot. One of the posts set as described above needs renewing, but its decay is due to shell rot, and this 5 ft. above the ground.

Any man connected with an electric lighting system knows that ten poles fail due to heart rot to one of shell rot, and the same proportion should hold here. When an added investment of about two dollars lengthens the life of a beam 200 or 300 per cent, the investment is good.

Correspondence Department



If you want help in any branch of building construction, just write to the Building Age Correspondence Dept. We will be glad to answer all your questions without charge.

Questions should be confined to construction only, as the editors cannot undertake to design structures.

All readers are invited to discuss the questions and answers published.

What Are the Bearing Capacities of Various Soils ?

From R. W., Conn.—Kindly give me through your correspondence column some information as to what the bearing capacities of various soils may be taken at, and what should be done to minimize settlements where rock and another soil are encountered on the same foundation site.

Answer—Presumptive capacities of soils may be taken as hereinafter tabulated below, in the absence of where it is not convenient to make tests as to the safe sustaining qualities.

In the absence of actual tests the different soils, excluding mud, may be deemed to sustain the following loads to the superficial foot, namely:

Soft clay	1 ton
Wet sand	2 tons
Firm clay	2 tons
Sand and clay, mixed or in layers	2 tons
Fine and dry sand	3 tons
Hard dry clay	4 tons
Coarse sand	4 tons
Gravel	6 tons
Soft rock	8 tons
Hard pan	10 tons
Medium rock	15 tons
Hard rock	40 to 80 tons

In the event of the soil under the footings of any one building being partly on rock and partly on yielding soil, the bearing capacity of yielding soil should be taken at not more than one-half of the capacity otherwise allowed.

Example:—

Suppose we consider a foundation partly on rock and partly on hard dry clay, with a load of 8 tons per running foot at the base. How wide should the footing be on the yielding soil?

Referring to the list giving the safe bearing capacities for various kinds of soils, we find that hard dry clay is good for a bearing capacity of 4 tons per superficial foot. Having an 8-ton load per running foot to provide bearing for, we divide 8 by 4, which gives 2. In other words, under ordinary conditions a 2 ft. wide footing would be wide enough. But as the question of rock must be taken into consideration and only one-half the bearing value used as given, the footing would have to cover 4 sq. ft. on yielding soil or be 4 ft. in width.—W. G.

What Removes Aluminum Paint from Sprinkler Heads ?

From W. P. & D. C. Co., New York.—Kindly advise me through your correspondence column what will remove aluminum paint from sprinkler heads.

Answer: The removal of aluminum paint from sprinkler heads can be accomplished by applying to and washing them with a solution of pearlash (potash) in water.

After the solution has had proper time to work the aluminum on the heads can be rubbed off with a scraper or wire wool.

You can buy a paint remover already mixed for use if you desire.

There may be some of the readers who would be interested to know why it is desired to remove the aluminum from the heads.

The trouble is that it is unlawful in the City of New York to paint them, and where they are painted the Fire Department serves notice on the owner to have the paint removed or place new heads on the system.

Sprinkler heads should not be painted for the reason that when the paint becomes hard, as in the case of banana oil in the aluminum paint, it would most probably prevent the release of the glass disk in case of fire at the temperature at which they were fused to operate, which delay might cause an avoidable conflagration.—W. G.

How to Figure Board Measure

From C. S., New York.—Will you kindly inform me of a quick method of figuring board measure, with examples?

Answer—One foot, board measure, is a board 1 ft. wide, 1 ft. long and 1 in. thick. To find the board measure of any piece of lumber, multiply the width of the timber in inches by the thickness in inches and divide the result by 12; the result is multiplied by the length of the timber in feet.

As a formula, this can be stated as follows:

$$\frac{\text{Width (in.)} \times \text{thickness (in.)}}{12} \times \text{length (ft.)}$$

Take an 8 ft., 2 x 4 stud. 2 x 4 (width × thickness) = 8; divided by 12 $= \frac{8}{12}$; multiplied by 8 (length in ft.) = $\frac{64}{12} = 5\frac{4}{12}$ or 5 1/3 ft. board measure.

Boards less than 1 in. thick are measured as if they were an inch thick, but for ⅜ in. and ⅝ in. stock a reduced price is generally made. E. D.

Construction of a Grain Elevator

From G. L. R., Kansas.—I should like you to give me a sketch of a grain elevator of small size, about 15,000 bushels, designed to dump the wheat from the farmer's wagon, and grade, and load into cars. A friend came to me to-day and wanted me to build one for him. I have no plan and so I am asking this of you, that if you have something to give me the idea, I can make the blue print and go ahead, so if you will please send me a sketch of an elevator that I can work into what I want, you will greatly oblige me.

Answer—A general description of what would be required in an elevator such as you had in mind, and some particulars as to how it should be built are as follows:

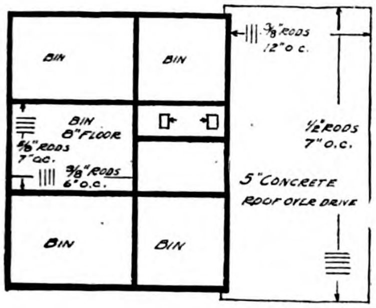
Starting from the point where the wagon arrives with the grain to receive it, there should be provided a dumping hopper whose top should be at grade level, from which the grain would be transferred by means of a cup elevator to the receiving bin. From the receiving bin the grain would be let into an enclosed weighing scale located on the first floor, which should be on a level with wagon bottoms and which could be used as a loading platform. It is then let into a conveyor, which takes it across to a cup elevator, which in turn takes it to the top of building, at which place it is let into another conveyor, and from that into any bin where it is desired to store it.

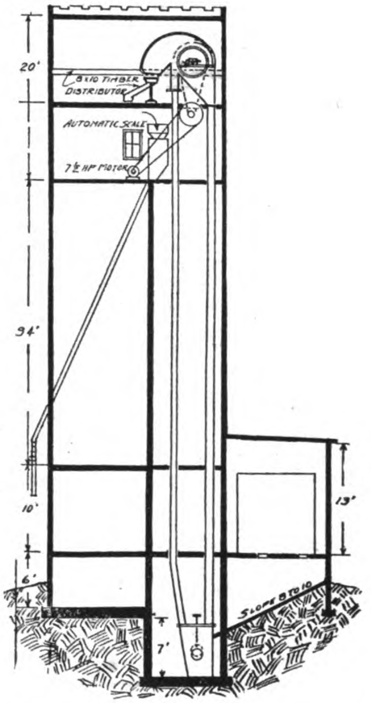
The storage bins should have hopper bottoms with spouts below ceiling over loading platform. Should it be desirous of transferring the grain from one bin to another, it is done as follows: an extension spout is placed to the one at hopper bottom and a small trap door nearest to that bin in platform at first floor opened; a conveyor below the floor takes the grain to cup elevator in which it is taken up and conveyed to any bin.

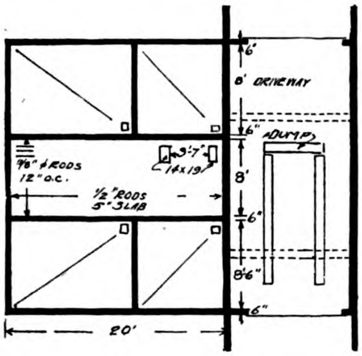
The exact layout of an elevator depends on the kind and size of machinery installed.

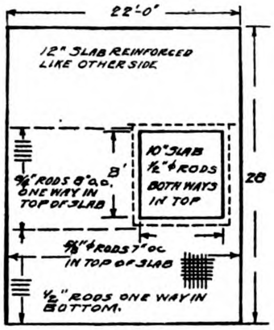
For a complete layout showing the exact location of machinery, etc., we would therefore recommend that you take the matter up with one of the manufacturers of this type of machinery, the names of which you can obtain from the Department of Agriculture at Washington, D. C., and any of which manufacturers will be only too pleased to give you complete plans into which their particular type of machinery can be accurately fitted.

The plans and cross section of the elevator illustrated herewith are those of a grain elevator built in Illinois, and of 20,000 bu. capacity.—W. G.









Plans and Cross-Section of Grain Elevator with 20,000 Bu. Capacity

Timber Sizes for Balloon and Mill Type Frames

From J. S. R., Mass.—Can some reader give sizes of timber for balloon-braced frame and buildings of mill type?

Answer—The table published herewith is one which I believe will be useful, as it shows at a glance the approximate timber sizes for the various frame constructions of areas as noted thereon.

Attention is called to the fact that the sizes may be varied according to circumstances, which can only be determined by those using them. But they will give something to work upon, which I believe fulfills J. S. R.'s request, as they all are based on general good practice.—W. G.

Members	Balloon Frame Buildings Not Over 1500 Sq. Ft. Area	Balloon Frame Buildings Over 1500 Sq. Ft. Area	Braced Frame Buildings Not Over 1500 Sq. Ft. Area	Braced Frame Buildings Over 1500 Sq. Ft. Area	Slow Burning Construction
Corner posts	2x4 and 4x6	2x6 and 6x8	2x4 to 4x6	2x6 to 6x8	10x10 and 10x12
Sills	2x6 and 4x6	4x6 and 4x8	4x6 to 4x8	4x8 to 4x10	6x10
Plates	2x4 and 4x6	4x4 and 4x6	4x4 and 4x6	4x6 to 6x6	6x10
Interities			4x6 and 4x8	6x6 to 6x8	6x8
Ledger boards	1x4	1½x4			
Double studs	3x4x4x4	3x6 and 4x6	3x4 and 4x4	3x6 to 4x6	2" or 3" plank
Single studs	2x4	2x6	2x4	2x6 to 3x6	
Braces	2x4	2x6	4x4 and 4x6	4x6 to 6x6	6x8
Sheathing	1x8 and 1x9	1x8 and 1x9	1x8 and 1x9	1x8 to 1x9	1½" plank, 2" thick
Rough floor	1x6 and 1x8	1x6 and 1x8	1x6 and 1x8	1x6 and 1x8	3" to 4" plank
Finished floor	⅞x2¼ and ⅞x3½	⅞x2¼ and ⅞x3½	⅞x2¼ and ⅞x3½	⅞x2¼ to ⅞x3½	⅞" to 1½" plank
Floor joist	2x8 to 3x10	3x8 to 3x12	2x8 to 3x10	3x8 to 3x12	4x8 to 10x14

Convention Held at Atlantic City Will Help Bring Increased Activity to the Building Industry

Board to Be Maintained at Washington Will Co-operate with the Government and Look After Interests of the Trade

That the government is certain to realize that the building industry is essential to the welfare of this nation is the outstanding feature of the convention held at Atlantic City July 15-16.

Two main results were accomplished by this organization of a nation-wide federation of the building industry:

1—To co-operate with the government for the winning of the war by placing every resource of the building industry at the immediate service of the country.

2—To save the non-war branches of the building industry from impending disaster, and to spur on private building.

In order to further this second purpose, a war industries committee was elected to establish headquarters in Washington. This board is to work for concessions which will enable the building trade to survive material and transportation embargoes. It will also co-operate with the government by placing knowledge of the resources of the building trades in such shape that immediate service can be given when needed.

The convention was called by the Chamber of Commerce of the United States at the instigation of the committee elected at the informal meeting held June 14 in New York City. The attendance was large, representatives of the branches of various industries from all sections of the country being present.

Great Need for the Conference

In calling the meeting to order, Harry A. Wheeler, president of the National Chamber of Commerce, summed up the need for the conference by stating that:

Our excuse for calling this conference lies, first, in the fact that, as we have been studying the industries of this country and their relationship to the war program, we have found no single industry so far-reaching and so much disintegrated as the building trades.

There are splendid organizations representing the different industries in the building trades. They are working with great efficiency in so far as their respective lines are concerned with the authorities at Washington; but it is not enough that these unit industries should be organized, for no industry making up a part of the building trades can speak for the building trades as a whole.

Your industry, because of its ramifications, presents more problems than any industry we have yet undertaken to counsel with; but problems are solvable in these times and men's minds are working curiously toward a common and co-operative end. America's problem is no longer a question solely of production or conversion to increase production, but it is a problem that lies at the root of American business and of the successful maintenance of the disintegration of certain lines of business that are so-called non-war. Somehow or other American business has been exceedingly individualistic. You have multiplied your organizations by name without finding unity in the organizations that ought to relate to each other. The time has come when men must divest themselves of their old ideas and stand together shoulder to shoulder with a common purpose, for a common end, in order that business may be preserved and our warfare may be successfully continued.

And if the building interests are to be so far represented that, with a common voice, they can present their needs and can lay their grievances at the feet of the Government, then they must be represented by a federation that will be of their own choosing and their own making, and by a committee that will be of their own election and that committee not only charged with responsibilities, but having the united co-operation of every industry in the building trades.

What a Prominent Senator Thinks of the Building Situation

A keen and sympathetic talk was given by Hon. William M. Calder, U. S. Senator from New York. It is interesting, and we are glad to reproduce it in part as follows:

I have complained that it was a mistake for the Treasury Department to discourage the building of houses and the financing of building operations. I have pointed out that while in 1915 the total building operations of the country reached the enormous sum of $1,800,000,000, this year outside of the government construction the total would be less than $300,000,000. I have indicated, too, that in many of the large cities of the country the failure to build homes for the people has brought about a condition whereby rentals have increased in some instances 50 per cent, and that next year, unless relief is obtained, there would be a dearth of living accommodations for our people. I have not approved either of the Government's going into the business of building homes by the wholesale for its workmen, for I am of the opinion that with the enormous profits made by the great munition and shipbuilding plants they could in most cases take care of the housing of their own men if the Government insisted that it be done. In this connection it is well to point out that Congress has already appropriated $110,000,000 for this purpose, and if we are to take the opinion of men who are attached to this house-building bureau of the Government, $1,000,000,000 will be required in the not far future. This entire scheme, in my judgment, is conducive to waste, inefficiency and extravagance. I have felt that the best results were to be obtained both for the Nation and your industry by disturbing as little as possible the ordinary conduct of your trade.

What the New Organization Can Do

I think it highly important that an organization should exist in this Nation composed of every element in the building industry so that the Government will be thoroughly informed upon the country's needs and the possibility of meeting them. There exists in Washington the War Industries Board, presided over by Mr. Baruch, which has been performing wonderful service for the Nation. It is the business of this Board to co-ordinate the war needs of the country that the very best results may be obtained from the standpoint of the Government necessities, having in mind always the preservation of the producer's ability to maintain his plant in the highest state of efficiency. I have felt, however, at times, that this Board lacked real information, that very often it was apt to make a decision that might cripple business because it did not have full knowledge of the facts. An organization such as you have perfected here can be most helpful in laying the facts before this Board.

Baker Says "Produce New Wealth"

In his address before the United States Chamber of Commerce in this city some months ago, Secretary Baker said, "There is but one answer to the destruction of the wealth of the world that has been going on, and that is the production of new wealth. Therefore, the primary function of business is to produce." In line with this it is thought by many that the authorities should encourage production in such manner as to improve the national tools of industry, so that they may be operating with increasing efficiency until they are drafted for specific war purposes. This is not business for pleasure, or in the ordinary meaning, business for profit—but business to win.

Luxury building had practically ceased before the war commenced owing to the increased cost of building, which then amounted to approximately 30 per cent; and now, with a proposed further increase of some 25 per cent in cost of the transportation of building material and the difficulty in securing funds, it is doubtful if any but necessary buildings would be undertaken.

The building industry is a national facility. Its product is in great demand and will be in even greater demand when the war is over. It is therefore in the interest of the public welfare that this national facility should be conserved. * * *

Don't Sacrifice Present for Future

Unless an emergency exists so great as to require the United States to risk the future for the present, is it not safer to plan for a war of long duration, so that we may become economically stronger month by month and meet, as the war develops, all emergencies and reverses, rather than to follow the English precedent—which was to release labor, materials and capital for immediate use regardless of the future reaction? But even in their emergency the English policy was not applied to the entire British Empire, and that policy cannot be applied throughout a vast country such as ours, with its different and varying conditions of finance, labor, transportation and climate.

England was compelled to sacrifice her future to her present—but England could take comfort in the knowledge that others stood behind her to carry on business and wealth production. No nation stands behind us. Responsibility for the war, not only in a military, but in financial and industrial aspect, rests upon us, and the policy of sacrificing the future to the present should gradually be modified with these facts in view. * * *

As a Nation we are drifting from individualism toward various forms of governmental control, and it is vital for the present and future welfare of the country that these forms of government control should be constructive rather than purely regulative. Moreover, a full knowledge and correct correlation of the facts is impossible at this time, and regulative control based on partial knowledge and incomplete analysis of facts is dangerous. Unfortunately, successive forms of regulative control neutralize one another and become ineffective. * * *

To shut off the wealth-producing industry of a nation is like shutting off the motive power of an airplane—instead of controlled and accelerated progress it means an involuntary landing within a limited radius.

Why the Building Industry Is of Paramount Importance

No industry in all the country is more wealth-producing than the building industry. It creates wealth; it makes additional taxable property on which taxes are more easily collected than from any other source. It increases land values, in fact it is the fundamental source of wealth, and if any line of endeavor should be encouraged, it seems to me the one in which you are interested ought to receive the fullest consideration.

In my judgment, it is imperative that you have the Government at Washington understand how all important this whole subject is to the immediate needs of the Nation. The Nation's building operations this year totaled approximately $1,200,000,000; next year it will hardly exceed $700,000,000. In many cities of the country there are large numbers of building trade mechanics walking the streets. It is true, there has been a demand for some of these men in other callings, in the adjustment of business along the line of war necessities, but there will come a time and that very soon when the workmen formerly needed by the building trade will, without the slightest inconvenience to other lines, return to their previous occupations. The country, too, will see the wisdom of encouraging a proper and conservative financing of the Nation's building needs.

Need for Nation-Wide Organization

Another worthwhile address was made by William B. King, General Counsel of the National Association of Builders' Exchanges. It was in part, as follows:

This call is in pursuance of a policy very early declared in the progress of the war by Walter S. Gifford, Director of the Council of National Defense, who said: "Each industry would best serve the Government if it were organized on a nation-wide basis with complete representation of all members of the industry. Organization along state lines or by localities is admirable for chambers of commerce and local civic associations, but our industrial life is not so bounded. Industries are not largely affected by state lines. A national organization by industries is the form of organization that will best serve the Government both in time of war and in time of peace. We have never needed such organized industry as much as we need it now when we are engaged in this great war, and we never have needed it as much as we shall need it after this war is over, when we shall be in the midst of a world competition of unknown proportions. If we had had such an organization of business in this country at the outbreak of the war, the problem of mobilizing industry for war would have been simple."

This policy has been followed consistently and numerous national organizations of diverse occupations, many of them in the building industry, have been formed for war purposes and have rendered great national service. It is a matter of surprise that the building industry as a whole has never before responded to this invitation and formed a national organization. It is the second largest productive industry of the country, with an annual product of $2,000,000,000 in enduring wealth. It involves production of many materials, their distribution through many dealers, and their use by many contractors and workmen. It engages the services of two professions—Architects and Engineers. Its very complexity is the chief reason why federation has never before been attempted. Yet this is the very reason why it should be done. Separate organizations of trades are valuable, but each takes a partial and one-sided view. An organization on broader lines is needed, which can view the entire industry as a whole in its relation to the war, adjust differences, provide substitutions of materials and methods made necessary by abnormal conditions and aid in adapting the industry to the war to the most effective end. Co-operation and co-ordination in the various branches of the industry are to be achieved. * * *

The Government is the senior and managing partner in this business, but has recognized that all the partners must co-operate to succeed in this great business. It welcomes aid from all sources. It will be the duty of our organization first of all to render such aid to the fullest extent of the resources of the industry.

We all recognize that the profound disturbance of the building industry, which has taken place, is the normal result of the war. We are making no complaints. We are proud to suffer in such a cause. But our leaders at Washington have no desire to cause more disturbance than is actually necessary. They are glad to see any productive industry making progress when this is consistent with war needs. There is no desire to kill business. Necessary injury is a matter of great regret. We are, therefore, confident of our official welcome not only when we come to Washington with proffers of aid to carry on the war, but with suggestions whereby labor can be employed wisely in productive industry. The spirit of cooperation can be confidently looked for between the governmental authorities and our organization.

What Can Be Done By the War Service Committee

This discussion of principles, then, brings me to the practical statement of what can be done by our War Service Committee:

1. We can render aid to the Government by centralizing our resources and consolidating our information.

2. We can make suggestions in regard to the policy of the Government so as to limit the harm necessarily done and to leave the building industry the largest practicable scope for activity.

3. We can aid in holding the organization of the entire industry during the war so as to resume work with the least possible delay when peace comes.

4. We can serve as a center of education and information for all the branches of our entire industry so that all matters of importance may be disseminated throughout the entire trades.

Inquiries made by the National Association of Builders' Exchanges in various parts of the country indicate a surplus of skilled and unskilled labor in some parts of the country and a deficiency elsewhere. A strong and well supported federated building organization might take steps to equalize the needs and supply of various parts of the country.

Department of Masonry Construction

CONCRETE, BRICK, ETC.

Practical Ideas Which Will Help You Do A Quicker and Better Job

How to Build and Fireproof with Hollow Tile—IV

Various Kinds and Sizes of Hollow Tile Used for Interior Partitions Are Described and the Proper Method of Using Them Explained.

By J. J. Cosgrove

It is common belief among masons who have had no experience in hollow tile construction that while hollow tile partition blocks vary in thickness, otherwise they are all the same size. On account of this belief, I want to emphasize the fact that it is not true. Hollow partition tiles are commonly made in two sizes, namely, 12 in. high by 12 in. long, and 8 in. high by 12 in. long. Then, again, they can be had in any size required, but special sizes necessarily add to the cost of the material, and require more time for their delivery.

Partition tiles are made 2 in. thick, 3 in. thick, 4 in. thick, 5 in. thick and 6 in. thick. Stock sizes of the tile can be found in the accompanying table.

Stock Sizes of Hollow Partition Tile

2x 8x12	4x 8x12	5x12x12	8x12x12
3x 8x12	4x12x12	6x 8x12	10x12x12
3x12x12	5x 8x12	6x12x12	12x12x12

The comparative design in both porous and semi-porous material is shown in Fig. 23. It is not good practice, however, to use 2-in. blocks for partitions, except for closets or shafts, unless the courses are reinforced with metal.

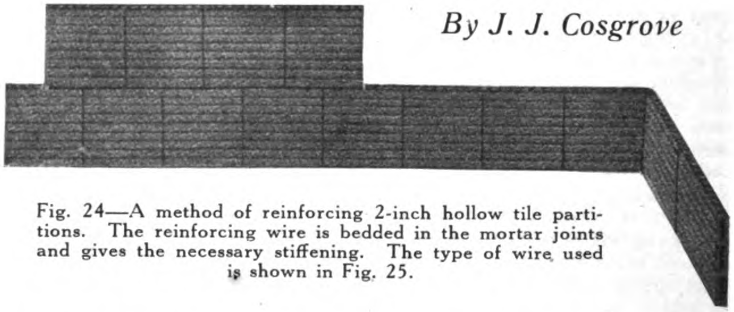


Fig. 24—A method of reinforcing 2-inch hollow tile partitions. The reinforcing wire is bedded in the mortar joints and gives the necessary stiffening. The type of wire used is shown in Fig. 25.

Good practice limits the height of hollow tile partitions to 12 ft. for 3-in. blocks, 16 ft. for 4-in. blocks and 20 ft. for 6-in. blocks. If 3 or 4-in. walls are to be carried higher than the limits set by good practice, are extremely long without side supports, or are exposed to wind pressure, they should be reinforced the same as 2-in. partitions.

A method of reinforcing 2-in. hollow tile partition is shown in Fig. 24, and the wire truss used for this purpose is shown in Fig. 25. This same method may be used for reinforcing wider partitions, and wire truss is made 1, 2, 3 and 4 in. wide for this purpose. The truss wire is bedded in the mortar in the horizontal courses, thereby giving the necessary stiffening. Instead of truss wire in the horizontal joints angle irons may be used at the corners. When truss wire is used, it is simply folded at the corners, as shown in Fig. 26, thereby stiffening the corners. For estimating the cost of freight and carting, it is necessary to know the average weight of hollow tile. The weight per square foot of porous and semi-porous tile partition blocks can be found in the following table:

Weights, Per Square Foot, Porous and Semi-Porous Partition Tile

2-inch	16 lbs.
3-inch	16 lbs.
4-inch	18 lbs.
5-inch	21 lbs.
6-inch	24 lbs.
8-inch	32 lbs.
10-inch	38 lbs.
12-inch	44 lbs.

All partition and furring tile, unless otherwise specified, are scratched or grooved to form a key for the plaster. If the surface of the partitions are not to be plastered, but left bare or whitewashed, the tile are made smooth. It is necessary, however, to specify and order smooth tile when wanted.

Provision must always be made for bonding where walls come together and trim is to be fastened. It is common

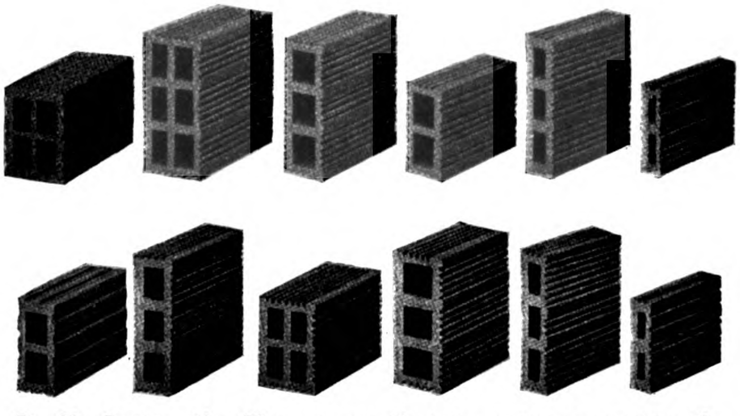


Fig. 23—Partition tile. The upper row illustrates semi-porous partition tile, the lower row porous partition tile.

practice in office buildings, hotels and like structures to have all the main corridor, stairway and elevator enclosures built of 4-in. blocks and partitions between rooms of 3-in. tile. Where two hollow tile partitions meet at an angle they should be bonded together. Where they butt against a brick wall they should be anchored by using tenpenny nails or special anchors at least every second joint.

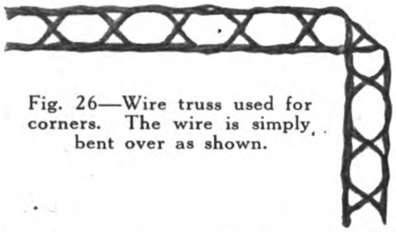


Fig. 26—Wire truss used for corners. The wire is simply bent over as shown.


Fig. 25—Wire truss used to strengthen 2-inch partitions. It is simply bedded in the mortar joint.

Tile for interior partitions should be set on end the same as for outside walls, except the top course, which may be set on side. Indeed, it is better to set the top course on side, as it is then easier to wedge with slate between the top course and the ceiling.

About 15 per cent of the quantity of tile required for interior partitions should be of full porous material. Along the bottom course every second tile should be porous, and around door and other openings porous blocks should be provided. It will be recalled that one of the properties of porous tile is the ease with which nails can be driven into them. By using porous blocks, therefore, where trim will be secured to the wall, much time and consequent expense can be saved. If porous tile are not supplied to nail to, the walls will have to be plugged between blocks to secure nailing place for grounds or trim. While porous blocks are slightly more expensive than semi-porous or dense tile, they prove more economical than the denser material when used in the right proportion by the saving they effect in labor.

In school buildings where blackboards have to be fastened to the walls, or in any other type of building where the walls must take and hold either nails or screws, all the tile should be full porous. This will make a slightly more expensive wall, but a much better one for the purpose.

Before starting to lay up a partition, wood or channel iron bucks or jambs should be placed in all doorway openings. These bucks or jambs should be 1½ in. wider than the thickness of the tile, so they will project three-quarters of an inch on each side of the partition and act as grounds for the plastering. The wooden bucks or jambs should be anchored to the tile walls by means of tenpenny nails spaced at least in each second joint.

A typical layout for an interior partition is shown in Fig. 27. The wooden bucks are set in place in the doorway and stayed there with braces. Along the floor line where the baseboard must be secured to the wall every second block is of porous material. Along the side of the doorway in like manner every second block is porous. This is sufficient for nailing the arm to, although some masons lay all the tile around the openings of porous material.

Closely allied to interior walls of hollow tile is terra-cotta wall furring, with which the mason should be familiar, as it will often aid him in increasing his work, and will improve the fireproof qualities of a building. Brick walls exposed to the weather must be furred to prevent dampness reaching the interior of the plastered surface and destroying both the plastering and the wall decorations. Formerly this was done by means of wood furring strips, wood lath and plaster. Now furring tile of dense, semi-dense and porous materials are available for the purpose.

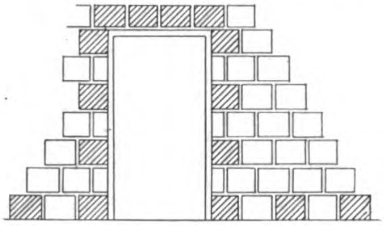


Fig. 27—A typical layout for a doorway in a hollow tile partition. The shaded tile indicate porous tile, which afford nailing surface.

Fig. 28 shows one of these tile split apart and ready for use. When they come from the kilns these two halves are joined together, but the connecting webs are deeply scored, deep enough so they will part when tapped on the edge by a mason, but shallow enough so the tile will not fall apart while in transit.

These tile, or half tile, are made 12 in. square and in two thicknesses, 1½ in. and 2 in. Their weight per square foot is 10 lb. The tile are set with the ribs against the wall, as shown in Fig. 29, thereby forming a series of air spaces which effectively check the passage of moisture. They should be set with the ribs vertical and be secured to the wall by driving tenpenny nails in the joints of the brickwork, the head of the nail being bent down upon the tile, using a nail over every third tile in every second course.

The tile should not be bedded in mortar at the back, since that would defeat their object by making a solid connection to carry the moisture through.

Where the walls must be straightened out to line with the face of the piers the 2-in. tile cannot be used. If the ceiling height is not too great 3-in. partition tile may answer well for the purpose. If the space is greater than the thickness of a 3-in. tile, the tile may be set out from the wall, leaving a clear air space behind them. In this case the furring should be braced at intervals by the use of drive anchors, or by using an occasional block of sufficient thickness to rest against the wall.


Fig. 28—Furring tile, used to fur out brick walls, taking the place of wood furring strips. The method of using them is shown in Fig. 29.

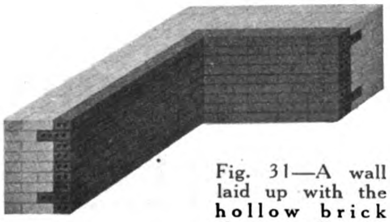


Fig. 31—A wall laid up with the hollow brick shown in Fig 30. Porous hollow brick are made which receive and hold nails, affording a good base for nailing trim.

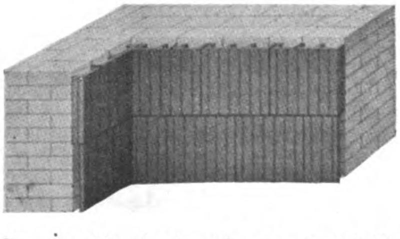


Fig. 29—The furring tile are set with the ribs against the wall, thereby forming a series of air spaces which check the passage of moisture. They are set with ribs vertical and secured to the wall by nails driven into the mortar joints of the brick wall. The head of the nail is bent down upon the tile.


Fig. 30—Hollow brick, made in the same sizes as common brick, can be used as furring in walls over 10 in. thick where the walls are not exposed to driving rainstorms.

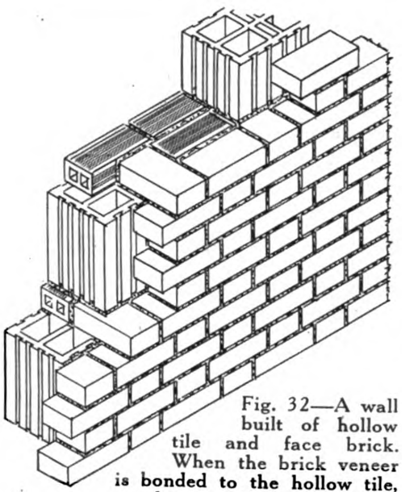


Fig. 32—A wall built of hollow tile and face brick. When the brick veneer is bonded to the hollow tile, as shown, full bearing value for the total thickness of the wall is allowed. When the brick veneer is secured by metal ties only, the hollow tile backing alone can be considered as bearing thickness.

Where walls are not exposed to driving rainstorms as, for instance, in courts, on the south side of buildings, or where the walls are more than 16 in. thick, they may be furred with hollow brick, Fig. 30, made of the same size as common brick. The building law of New York City allows them to be included as part of the thickness of the wall. They cost but very little more than common brick, make the cheapest form of furring, and are sufficiently effective for use in the walls of warehouses, factories and like buildings. Porous hollow brick are made which will receive and hold a nail, and are used where trim must be secured to the brickwork. A wall laid up with hollow brick for the inner course is shown in Fig. 31.

Hollow brick weigh 3 1/3 lbs. each. The header measures 2⅛ x 3½ x 7¼ in., while the stretchers are 2⅛ x 3½ x 8 in. Hollow porous stretchers are 2¼ x 3¾ x 8, while solid porous stretchers are the same dimensions as the hollow stretchers.

A feature of furring to keep constantly in mind is this: Most furring reduces the size of the room in which it is used by at least 2 in. This is a most important consideration where land is at a premium and rooms at their best are small. It is of less importance in institutions and country buildings where the buildings sprawl rather than grow tall. The hollow brick offers one means of economizing space for certain classes of city buildings, but unfortunately are not sufficient for all walls under all conditions.

Closely akin to walls furred with furring tile or hollow brick is the combination wall of hollow tile and face brick, shown in Fig. 32. This seems to serve all the purposes for which it was intended; beauty, economy, moisture proof, heat retardant and ranks high in the economy of space. It will be noticed the brick veneer is bonded to the hollow tile; where this is done full bearing value for the total thickness of the wall may be allowed. When the bricks are not bonded into the wall, but are secured with metal ties, only the hollow tile backing can be considered as bearing surface or a bearing wall.

(To be continued.)

How to Design a Retaining Wall—III

By L. Goodman, C. E.

Inner Cantilever

The forces acting downward on the inner cantilever are the weight of the earth resting on it, which is equal to $3.75 \times 14.75 \times 100$ or 5530 lb., and the weight of the concrete, which is equal to $3.75 \times 1.25 \times 150$, or 700 lb., while the upward force is the upward pressure of the soil as shown in Fig. 2, to be equal to $\frac{1650 \times 2.59}{2}$, or 2140 lb. By taking moments of these forces about the section at the inside face of the vertical wall we have

$$M = 5530 \times \frac{3.75}{2} + 700 \times \frac{3.75}{2}$$

$$-2140 \times \frac{2.59}{3} = 9830 \text{ ft.-lb.}$$

$$\therefore d = \sqrt{\frac{M}{bK}} = \sqrt{\frac{9830 \times 12}{12 \times 107.4}}$$

$= 9.5$ in.; adding 1.5 in. for protection, the thickness of footing required for moment is 11 in.

$$A_s = \frac{M}{f_s jd} = \frac{9830 \times 12}{16000 \times .874 \times 9.5} = 0.89$$

⅝-in. bars, 5 in. centers, gives an area of 0.94 in.

Bars to be placed at top or tension side of inner cantilever. In a cantilever it is necessary to investigate the shear and bond stress as these will often control.

The total shear $V = 5530 + 700 - 2140 = 4090$ lb.

$$\text{Unit shear } v = \frac{V}{bjd} = \frac{4090}{12 \times .874 \times 9.5}$$

$= 41$ lb.-sq. in.

$$\text{The bond stress } u = \frac{V}{\Sigma_{o} jd} =$$

$$\frac{4090}{2.4 \times 2.5 \times .874 \times 9.5} = 82 \text{ lb. sq. in.}$$

While the design might be accepted as computed, it is not considered good policy to make the footing less than 12 in. thick. It will also be found more convenient to space the horizontal bars 1.5 times or twice the spacing of the vertical bars. Thus if we use ⅝ in. bars 8 in. on centers, and a footing which is

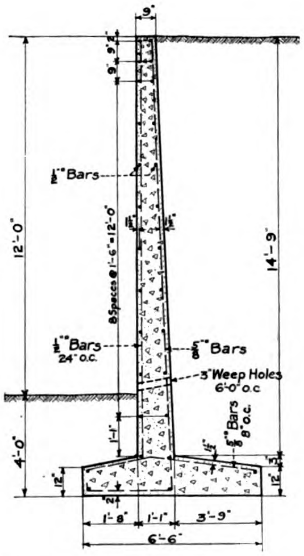


Fig. 2—Section of reinforced concrete retaining wall.

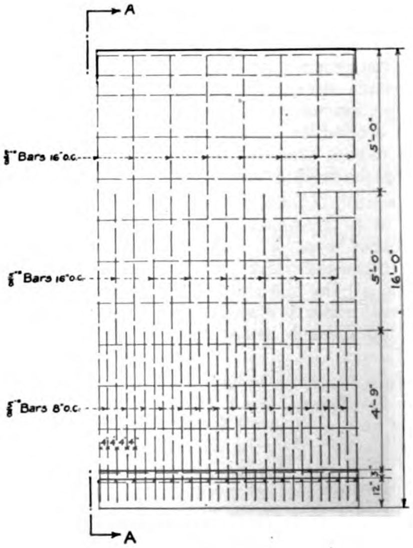


Fig. 3—Elevation of retaining wall. This shows placing of reinforcement as finally calculated.

15 in. thick at the vertical stem and 12 in. at the toe we have

$$p = \frac{A_s}{bd} = \frac{0.59}{12 \times 13.5} = .0036$$

$$f_s = \frac{M}{A_s jd} = \frac{9830 \times 12}{.59 \times .907 \times 13.5} = 16{,}300$$

lb. per square inch.

$$v = \frac{V}{bjd} = \frac{4090}{13 \times .907 \times 13.5} = 28 \text{ lb.}$$

per square inch.

$$u = \frac{V}{\Sigma ojd} = \frac{4090}{3.75 \times .907 \times 13.5} = 89 \text{ lb.}$$

per square inch.

Which values will be considered safe.

The embedment required for the horizontal bars.

$$\text{Embedment} = \frac{16300 \times .39}{2.5 \times 100} = 26 \text{ in.}$$

This can be secured by extending the bars into the outer toe, as shown in Fig. 3 in the July issue.

Outer Cantilever

The forces acting on the outer cantilever are the weight of the concrete, which is 1.67 × 1.25 × 150, or 310 lbs., and the upward pressure of the soil, which is equal to $\frac{3400 + 2340}{2} \times 1.67$, or 4790 lbs.

Therefore the shear is the difference of these two or

$$V = 4790 - 310 = 4480 \text{ lbs.}$$

The moment about the section at the outer face of the vertical wall is

$$M = 310 \times .84 - 4790 \times .84 = -3760' \text{ lb.}$$

Note that the shear acts upward and the moment puts tension in the lower face of the outer cantilever.

As we have bent the bars of the vertical stem into the outer cantilever of the footing, and as it is hardly worth while changing the depth of footing from that used for the inner cantilever, we simply have to investigate the stresses as follows:

$$p = \frac{A_s}{bd} = \frac{1.17}{12 \times 13} = .0075$$

$$f_s = \frac{M}{A_s jd} = \frac{3760 \times 12}{1.17 \times .876 \times 13} = 3390 \text{ lb.}$$

per square inch

$$v = \frac{V}{bjd} = \frac{4480}{12 \times .876 \times 13} = 33 \text{ lb. per}$$

square inch.

$$u = \frac{V}{\Sigma ojd} = \frac{4480}{7.5 \times .876 \times 13} = 52 \text{ lb. per}$$

square inch

$$\text{Embedment} = \frac{3390 \times .39}{2.5 \times 100} = 5''.$$

These values are well within the allowable limits.

Shrinkage Reinforcement

To prevent cracks forming in the vertical wall longitudinal bars should be introduced. According to the joint committee the amount of the shrinkage reinforcement should be not less than one-third of one per cent of the area of concrete tending to shrink. Thus for the vertical wall, the cross section of which is equal to $\frac{9 + 13}{2} \times 14.75 \times 12$, or 1950 sq. in., the area of the longitudinal bars should be .0033 × 1950, or 6.5 sq. in. If ½ in. square bars are used there would be required 26 of these bars. On the inside face of the vertical wall the longitudinal bars are tied to the vertical reinforcement, but on the outside face spacing bars have to be supplied to hold them in place, as shown on the drawing.

Fig. 3, shown in the July issue, shows the complete drawing of the wall. It should be noted in closing that the final dimensions differ slightly from the original assumptions used for investigating the stability. The difference is so slight, however, that it will hardly warrant a recalculation of the wall.

The End.

Some Kinks in Using Concrete

Practical Hints That Can Be Made Good Use Of

By John Upton

Concrete is coming into general use more and more each year. The first cost in some instances is less than that of timber and lumber. In some cases it costs a little more than wood, but is much more economical as it is more lasting.

The principal things for which I have used it are chimneys, cisterns, floors, porches, foundations.

For mixing I find a common square shovel is the proper thing. Where a wet mixture is to be made a tight mortar box is very convenient to have, but for the ordinary mixture an old door with a 2 x 4 on edge for the sides makes a good place to mix.

For forms I have used board and plank, the boards being used later for sheathing and roofing. The joists for a building will make good forms for a foundation.

For the concrete chimney one can often use the wall of the house for one or two sides of the forms. I built a chimney on a thick concrete wall without any outside forms except those used for the walls, the inside form being of boards which were burned out. These should be thin so they will not make much of a fire.

I have used a tapered square wood form for the inside of the chimney.

Have seen a square wood form with the corners cut off and the sides filled out so as to make it almost eight sided. This was made so that by pulling on a wire it would collapse enough so it might be withdrawn.

I secured a block machine and made these blocks used for the foundation of a house, also the porches and steps.

A home made concrete brick mould may be used for the chimney. Take two pieces of 2 x 4's about forty inches long. On one side have grooves or notches one-fourth inch deep and the same in width. These are two and one-half inches apart, so that when partitions nine inches long of one-fourth inch stuff are put in them they make a space the size of a brick on edge. There is a piece across each end with two blocks nailed on to hold the sides together. This mould holds twelve bricks, and with extra partitions on hand one can make the brick quite rapidly.

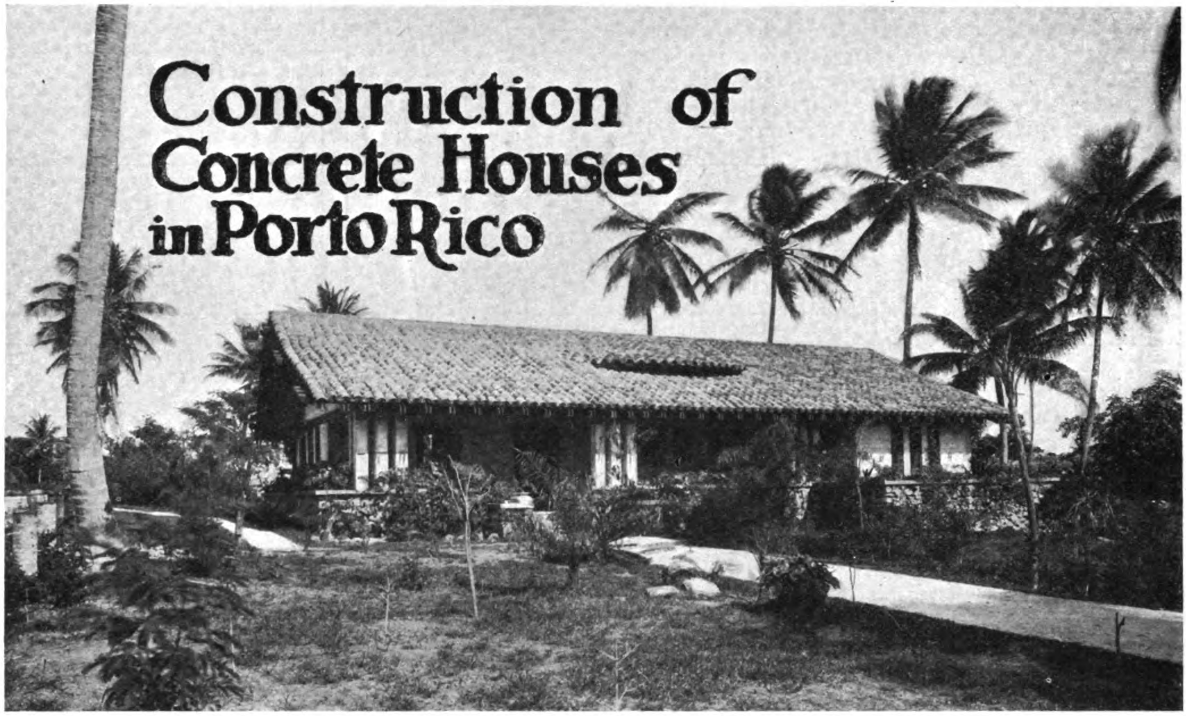
One can also use a home made concrete mixer. The main part can be a barrel of two-inch maple staves with a cover which can be fastened on like a barrel churn. This revolves like a barrel churn. A frame of 2 x 6 stuff holds this up. The motive power is a gasoline engine and the belt runs on a tight and loose pulley connected to the large and small gear wheels from a two-horse tread power. Any two wheels might be used or one could use two wheels, large and small, and a chain belt. This home made mixer did good service on one summer's job. We ran some two carloads of cement through it. It was later used in mixing concrete for the foundations of two houses.

In laying tile, where a tight job is desired, one can use concrete to make the joints tight. When necessary to make a T or Y the tile may be cut and the joints made tight with concrete.

To fix a chimney top (new or repair) make it of concrete. This top can be made in a form on the ground or walk, or it can be built in place, which would seem the better way as it can be more firmly anchored in place then.

Use forms of thin stuff for the inside but let the outside ones be inch lumber, and get it square with the rest of the work. Have your inside form a little the higher and then water will run to the outside, not down the inside. The facing mortar can be colored if desired though the natural color is not objectionable.

Construction of Concrete Houses in Porto Rico



The Concrete Bungalow That Architect Antonin Nechodoma Designed for Himself. The Roof Covering Is Old Spanish Tile.

Concrete Is the Popular Building Material of Porto Rico. This Article Tells How the Houses There Are Designed and Built to Meet the Requirements of the Warm Climate

Picturesque indeed are some of the architecural gems of Porto Rico. Dwellings of the better class erected in late years exhibit a high degree of architectural excellence, as the subjects of this article testify, and are designed with a view to taking every possible advantage of the prevailing trade wind which blows from the east, the best rooms of a house being so placed as to receive the benefit of it. This is necessary, for the yearly mean temperature is high, it averaging officially 80 deg. or more.

The majority of better class dwellings are constructed of concrete, for concrete is the popular building material of Porto Rico. Its cost closely approximates that of wood, for practically all building materials are imported from the United States, and the cost of freight added to the original cost of the material makes it just about as cheap to bring in the cement only and utilize the sand and stone which are indigenous. Another reason for the popularity of concrete is to be found in the relative coolness which it affords as compared with other materials.

Very often faience tiles are inserted in the outside walls, usually on the sides of columns and at the lower corners of windows, lending the touch of color which the Porto Rican loves.

The usual construction of concrete footings, walls, etc., is as follows:

The concrete footing course is from 9 in. to 12 in. deep, and from 2½ ft. to 3½ ft. in width. It is reinforced longitudinally with from three to five ¾ in. bars, and transversely by ½ in. bars placed 24 in. on centers.

Both footing and foundation wall are poured monolithic around the building, the mix used being a 1:3:6. The foundation wall is 10 in. thick and is reinforced by ½ in. bars placed 12 in. horizontally and 24 in. vertically on centers. This wall is carried up to the floor line and offset here to form a belt course on one

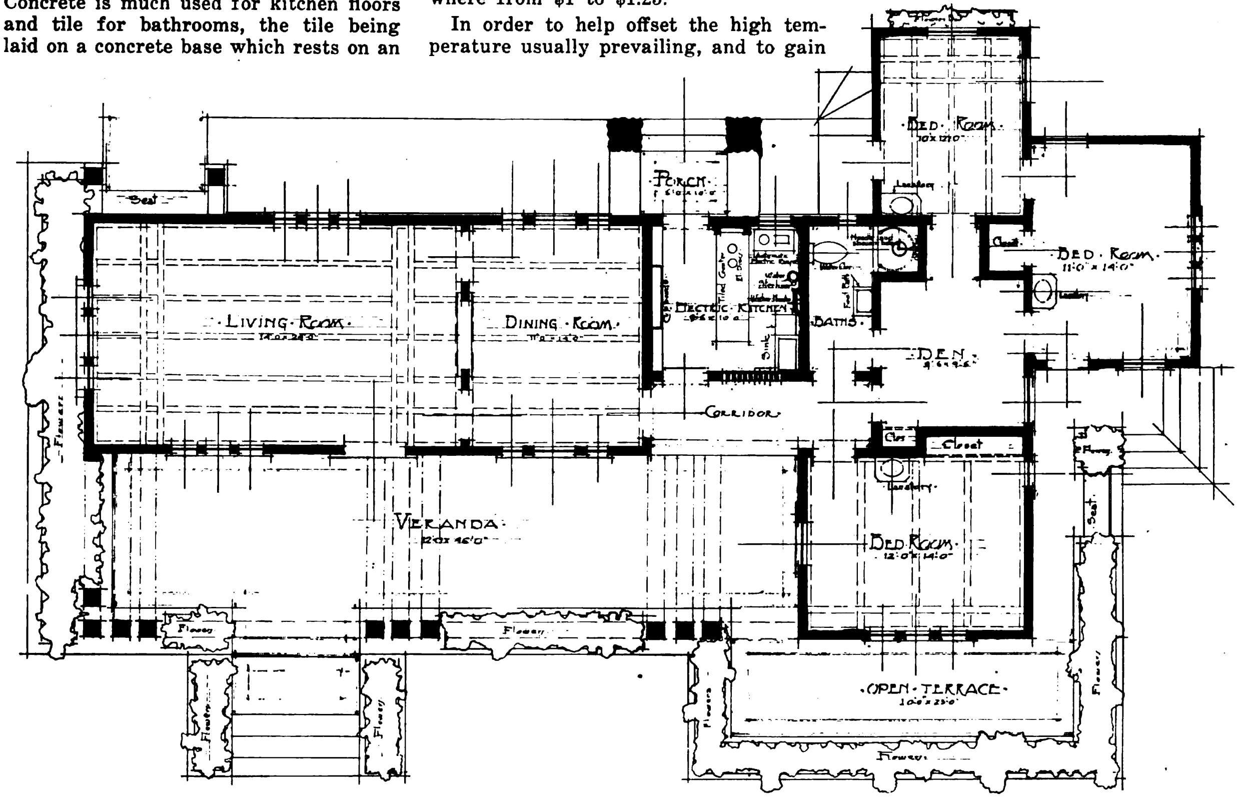
The Side of the Nechodoma Bungalow Is Quaint and Interesting.

side and a bearing for the floor joists on the other.

For one story structures, the house wall is usually 4 in. thick, although now 6 in. is being advocated. The reinforcement consists of ½ in. bars placed 12 in. horizontally and 24 in. vertically on centers.

Four inch walls are made of cement and screenings ranging from ¼ in. down, in the proportion of 1 to 5. The concrete is waterproofed, mixed by hand, and poured in 3 ft. courses. Twenty-four hours after pouring, the "forms" are removed and the wall is rubbed down while green with a wooden float, which eliminates the rough spots without discoloration.

Floors are usually of wood, although concrete and especially tile are popular. Concrete is much used for kitchen floors and tile for bathrooms, the tile being laid on a concrete base which rests on an earth fill. The surface of all concrete floors is given a hardener to prevent dusting. Floor joists are 2 x 8 in. placed 18 in. on centers and are supported by the footing wall and a center girder which rests on concrete posts. Floors are double, consisting of a sub-floor of one inch sheathing boards which receives the finish floor.



Notice How the Plan of the Nechodoma Bungalow Affords Excellent Ventilation in All Rooms, the Predominating Requirement in Porto Rico Homes.

Interior partitions are usually of metal lath and plaster. Where a center support is necessary for the roof joists reinforced concrete is used for the partitions. Partitions are 3 in. thick and rest directly on the floor, the joists being doubled to receive the extra weight, and the partitions are reinforced at corners and sides and top of door openings. For large houses it is, of course, necessary to use stronger construction.

Before concrete became popular walls were of brick and were usually from 18 in. to 24 in. thick, being plastered both inside and outside with a mortar composed of pulverized brick and natural cement. Old houses were usually of rectangular shape, a hall extending the full length of the building, the rooms opening on either side of this hall, somewhat similar to the house of Mr. F. Bird at Fajardo and illustrated herewith.

Although the materials of buildings erected on the island are more costly than in those erected in the United States because of the freight charges, yet lower labor costs bring down the expense. Carpenters' wages range from $2 to $3 per 8-hour day and ordinary laborers anywhere from $1 to $1.25.

In order to help offset the high temperature usually prevailing, and to gain thorough ventilation of the living room and dining room by providing free circulation of air between them, the two rooms are usually separated by a scheme typical of residences in the island; that is, a pilaster is placed at each side wall and two middle columns are connected by a low wall about three and a half or four feet high, and which may serve as a bookcase or as a sort of pedestal for flowers, leaving a passageway on each side. An arch is also often employed. This permits the breeze to sweep almost uninterruptedly through from all the adjacent openings.

Ceilings are usually very high, for it is a law in Porto Rico that all ceilings be at least 4 meters high, which is about 13 ft. These ceilings are usually of wood and have latticed ventilators in them which connect with the dead air space below the roof and carry out the heated air from the room through ventilators placed in the side walls or through eyebrow windows in the roof. Any roof windows are usually for ventilation purposes. Sometimes the ceiling is omitted, for the average roof has a very flat pitch and an overhang of from 3 to 4 ft. The majority of dwellings are of only one story, although there are many two-story dwellings, of which the house of Mr. Bird is an excellent illustration. This number of stories is seldom exceeded, the highest structure in the island being the telephone building at San Juan, which is four stories high.

In all important buildings the inside walls are usually finished by a one-half thickness of plaster placed directly on the exterior concrete wall.

Casement windows are in general use throughout the island, for they admit of better ventilation than the double-hung type. Another type of window often used consists of a small pane of glass under which is placed a sort of shutter or louvre ventilator. Shutters alone are also often used, for the requirement is to admit as much air and as little of the warm sun as possible.

As there is no sewerage system except in the business district of San Juan, a sort of septic tank is usually provided for each house. The system generally comprises two tanks, the first of which is constructed of concrete and is made

practically air tight. The second one is made of loose stones. In operation, the solids are retained in the first tank and the fluid drained into the second, from which it seeps out through the ground. The first tank requires cleaning about once a year and the second never needs attention These tanks are placed well down under ground.

The bungalow of Antonin Nechodoma at Condado, a suburb of San Juan, presents many interesting features of plan and design. The touch of an artist is seen in the treatment of the roof. A glance at the pictures shows how cleverly the effect is gained, for the front roof is broken ever so slightly so as to change the pitch. The break in the rear roof is so proportioned as to harmonize with the entire roof scheme.

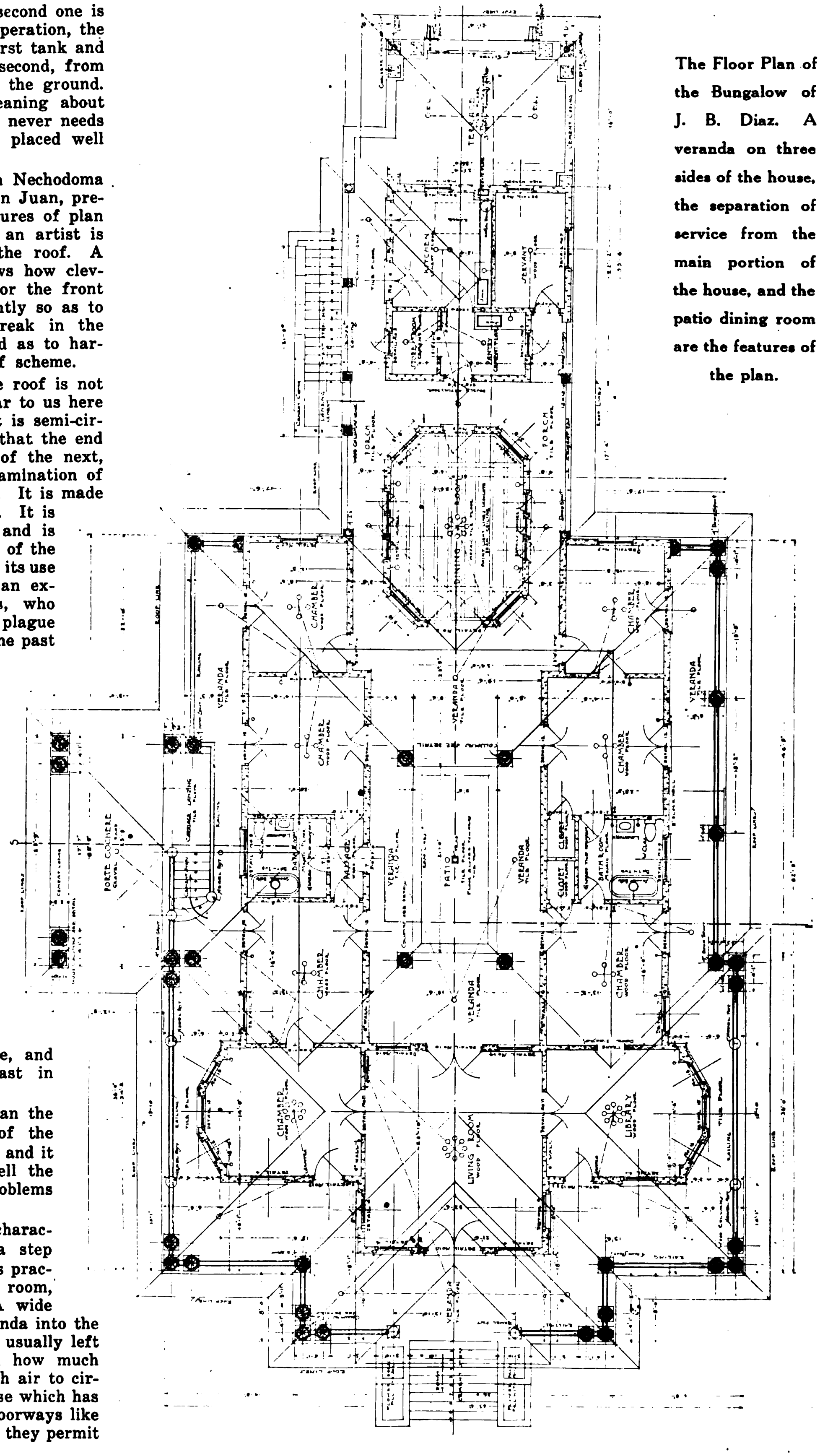
The tile which covers the roof is not like the Spanish tile familiar to us here in the United States, for it is semi-circular in shape and so laid that the end of one fits into the curve of the next, as can be seen from an examination of the front view of the house. It is made of clay and is pink in color. It is termed "old Spanish tile," and is the typical old roof covering of the country. Recently, however, its use is dying out, for it forms an excellent habitation for rats, who carry the dreaded bubonic plague which has several times in the past fastened its fangs in the little island. It can, however, be laid in an entirely sanitary manner. Slate, tin, asphaltic paper, metal and vitrified tile and other materials used in the United States are taking the place of this beautiful roof covering.

The exterior trim of the Nechodoma bungalow is painted brown. The porch floor is of large sized patterned tile. Either tile or cement is the popular material for porch floors, although wood is sometimes used.

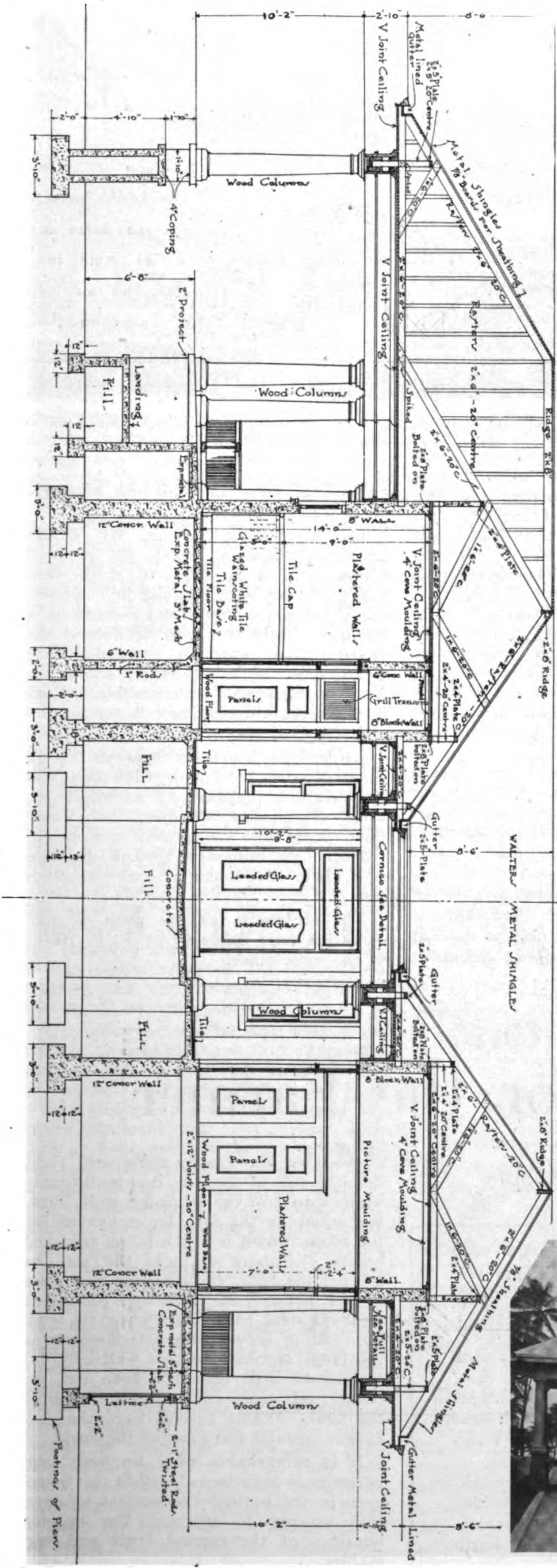
Rubble stone is used for the foundation walls instead of the usual concrete, and forms an agreeable contrast in scale to the roof tile.

In examining the floor plan the temperature requirements of the island must be kept in mind, and it will easily be seen how well the architect has solved the problems along this line.

Entrance is had from the characteristic wide veranda up a step into the living room, which is practically one with the dining room, as is the usual custom. A wide doorway leads from the veranda into the corridor, and as this door is usually left open it can easily be seen how much opportunity there is for fresh air to circulate in the part of the house which has just been described. Wide doorways like this are usually provided, for they permit



The Floor Plan of the Bungalow of J. B. Diaz. A veranda on three sides of the house, the separation of service from the main portion of the house, and the patio dining room are the features of the plan.



Cross Section of the Diaz Bungalow. This shows details of construction as usually practiced in Porto Rico

the inside to be made practically one with the porch.

The three bedrooms are also arranged so as to be open on three sides, and each of them is provided with a lavatory and a large closet. The floors here, as in the other rooms, are of Dominican mahogany. The hall which forms the connecting link between these rooms is termed a den, and it opens into the bathroom, which can also be entered from the corridor. The bathroom contains a needle and shower bath, foot bath and water closet.

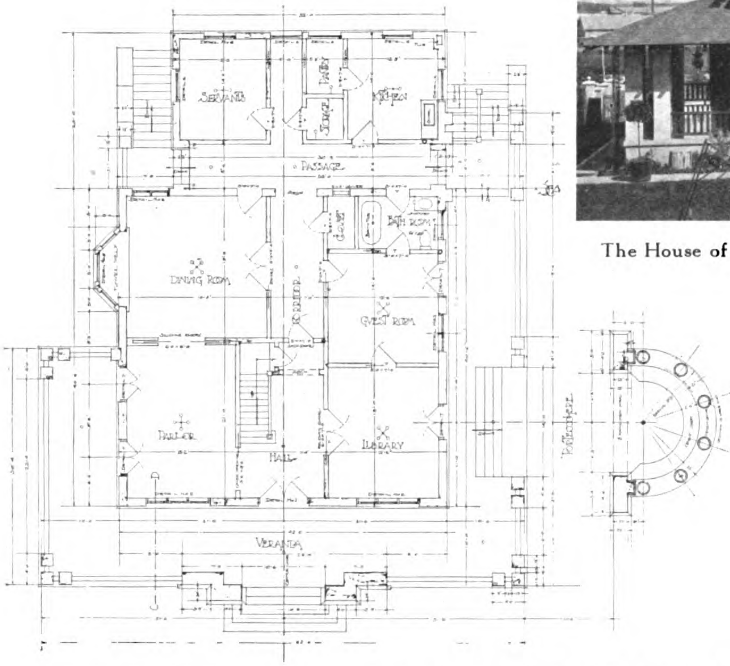
The kitchen is electrically equipped, there being an automatic electric range, water heater, tiled counter with two electric discs, cupboards, sink and water sterilizer. The water sterilizer is necessary because of the unsanitary condition of the old aqueduct which conveys the present water supply of the island. As there is no public filtering system, the water would come dirty and germladen from the faucets if some such apparatus were not provided. A small porch adjoins the kitchen. Ventilators or slats open into the corridor so that the breeze can have a clean sweep through.

A wealth of vegetation around the dwelling will be noticed, and the purpose of this is to aid in keeping the temperature down and also provide a beautiful screen which, while not interrupting the breezes, yet conceals the wide-open door spaces from too curious passers-by.

In large houses it is frequently desirable to introduce a *patio* or opening in the center of the dwelling, as shown in the plan of the bungalow of J. B. Diaz at San Juan. In this case the veranda is carried around on three sides of the dwelling, thus encircling all parts except the service portion. The position of the porches should be noted. The layout is an interesting one and will bear careful study of its relation to the temperature requirements as before outlined. The house is located on a slope, thus giving opportunity for the introduction of a basement containing two servants' rooms, laundry, storeroom and toilet—all with cement floors. The first

The Bungalow of Mr. J. B. Diaz at San Juan. The porch extends around the main portion of the house.

The House of Mr. Bird at Fajardo. This is an example of the occasional two-story dwelling of Porto Rico.



Floor Plan of the Bird House. This plan is typical of the older style two-story dwelling of Porto Rico.

story walls and bearing partitions are 8 in. thick, and partitions are 6 in. thick. The veranda, porches, *patio*, baths and dining room have tile floors; the living room, library and chambers have wooden floors, and the kitchen, pantry and storeroom have cement floors. The cross section shows some of the details of construction as practiced in large residences of this nature.

The arrangement of the bathrooms as regards the doors may not appeal to many of our readers. In the second story of the house of Mr. Bird there is a single bathroom, which may be entered from either of two adjoining chambers as well as from the hall—an arrangement which is certainly unusual.

The first story plan of Mr. Bird's house at Fajardo, which we present, shows some of the features of the rectangular plan with its long hall extending through the house and crossed by a passage. Here also will be noticed the characteristic spacious veranda. The exterior of the house clearly shows the Mission influence. A noticeable feature is the pergola extending out on the second story balcony.

All of the buildings presented were constructed in accordance with plans and specifications prepared by Architect Antonin Nechodome, Condado, San Juan, Porto Rico, and he is said to have introduced the bungalow type of dwelling into Porto Rico some nine or ten years ago.

The contracts for the work of construction were executed by F. B. Hatch of the same place.

A Fruit House for the Farmer

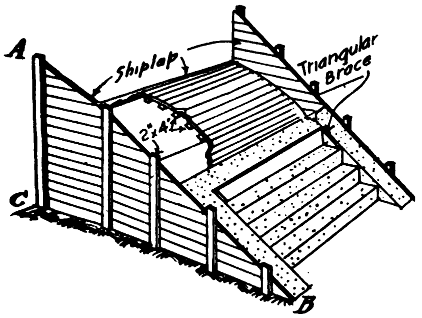
By Albert Marple

THERE is many a spare hillside on the farm, the suburban home place and even the city dwelling lot that might, by the exercise of a little "headwork" and the expenditure of a small amount of money be converted into a very practical fruit house, storeroom or tool shed. In this as in many another line it is simply a question of availing ourselves of our natural assets. This is what a home builder in Whittier, Cal., thought when he devised and constructed the novel, out-of-the-way storeroom shown in the accompanying illustration.

At the upper side of this fellow's lot it was necessary that the hillside be cut away in order that the home site might be on a level, and in turn this cut in the hill called for a 10-ft. retaining wall. Prior to the construction of this wall this fellow conceived the idea of building his family storeroom right into the side of the hill, eventually making it a part of the retaining wall. Suiting action to the idea he excavated for the room, which is 6 x 8 ft. in size, and before beginning to build the wall he erected the floor, ceiling, back and sides of this house 6 in. thick and reinforced by 1-in. steel rods, then when the wall was built it served very satisfactorily as the front section. In this wall or front section an 8-ft. door has been cut, or, rather, left open during the building of the wall. Frame shelves were then arranged around the sides of the room.

A Storeroom That Was Built into a Retaining Wall. This Idea Has the Added Merit of Keeping the Inside Cool Through the Insulating Value of the Earth.

It is remarkable what an even temperature is maintained within this room, even in the hottest and coldest of days, this serving to increase the keeping qualities of the canned fruit and vegetables.



A Form for a Concrete Stairway. Note how easily a curved under surface is obtained by the 2 x 4's and shiplap.

A Good Form for a Concrete Stairway

How to Lay It Out and Pour the Concrete

By E. V. Laughlin

Concrete stairways are not difficult to make nor are they unduly expensive. If made properly and reinforced adequately they will sustain very heavy loads without giving way. One I constructed some years ago is giving the best of satisfaction, and carries heavy loads without the slightest evidences of breaking down. A heavy piano was carried up it without straining its sustaining power in the least. Possibly the details of structure may suggest features of value to builders contemplating the erection of such a stairway.

The first and most important detail in constructing a stairway of this kind is the proper kind of a form. In this case parallel triangular walls, designated in the sketch as ABC, were placed at right angles to the walls of the building to be entered. These triangular walls were shiplap nailed to 2 in. by 4 in. studs, the smooth side facing inward. These walls were 4 ft. apart in this particular case. Before these walls were placed in position an adequate footing had been built where the foot of the stairs was expected to fall. This footing extended into the earth 12 in. At various places iron rods had been placed in order that the footing and the stairway might be firmly united.

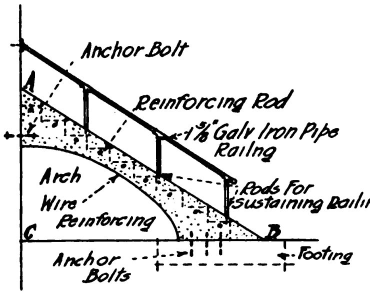
The following method was used in securing the arched shape that characterizes the under part of the stairway: The desired arch was marked off on the walls of the triangular form. The space between the walls was next bridged with 2 in. by 4 in. pieces of the proper length, the upper edge of these pieces following the line of the proposed arch. Flexible shiplap was then bent down to meet these bridges, the same being securely nailed at the ends.

In this stairway I desired a riser height of 8 in. and a tread width of about 11 in. These were properly marked on the shiplap walls along the indicated line of AB. The forms for the risers I made of 2 in. lumber, placing each in its place as the concrete went in. These riser forms were held in place by strips extending across to the outer forms. A triangular brace may carry from each riser form to the riser just below, thus holding the riser form from spreading outward. This brace also helps to make the forms for the abutments at the sides. Forms were not required for the treads for concrete hardens so rapidly that there was little tendency for the concrete to push out.

Various kinds of reinforcing were placed at the time the concrete was poured, some reaching from A to B, and some extending crosswise. A half-inch iron rod was buried in each tread about midway of its width. Anchorages into the brick wall against which the stairway rested was provided by inking holes into the brick large enough to receive the nut or head part of a good sized bolt. These were inserted at the moment the concrete was being poured, the latter being forced well into the holes well around the bolts.

It is well that the forms for concrete stairways should be undisturbed for three or four weeks after the concrete has been poured, and after the forms have been taken down the concrete should be given ample opportunity to dry thoroughly. A little caution at this stage is exceedingly timely. After the concrete has dried thoroughly the stairway may be used with every assurance that it will stand.

In conclusion, note the railing of galvanized pipe. While the concrete is soft iron rods are placed so as to project 6 or 7 in. above the treads. Later galvanized pipe is slipped over these, the space within the pipes being filled with cement. By means of T-unions pipe of the same size may be fastened to the tops of these vertical pieces of pipe, thus providing a sightly and secure railing.



Cross Section of Concrete Stairway. This is built up on the form shown above.

Concrete Boards Used in Building Construction

Boards of concrete, with joists, rafters and stair-frames of the same materials are used in the construction of a novel building in Los Angeles, California, the whole being set upon a concrete foundation. Though put together after the manner of a frame structure, the building is as fireproof and durable as the more common types of cement houses, but it requires less material and is lighter in weight.

The various parts are poured into forms on the ground near the site, and in that way the danger of breakage is eliminated. The clapboards are poured in sets of ten, the forms being securely clamped together, and the cement allowed to harden in them for several days. Then they are taken out and allowed to cure before being set up. This is done while the preliminary work is going on, such as excavating and laying the foundation.

The joists, rafters and other parts are formed in the same manner, and various types of reinforcing are used for each. The boards are reinforced with mesh like chicken wire, while the timbers have iron rods of varying thickness to strengthen them. These are allowed to project at one end in order to fit into corresponding holes in other timbers, so that the whole framework dovetails. The method of attaching the boards to the 2 x 4's is with nails, and nail-holes are bored into the cement boards before they have set by running a wire through them. As the cement timbers will not take the nails a strip of wood about an inch and a half thick is wired to the cement scantling.—*Scientific American.*

Legal Department

Is Verbal Evidence of Understanding at Signing of Contract Valid?

It is well understood as a general proposition that parol or verbal evidence of what is said or done at the time a written contract is made, is not admissible in court to vary, alter or contradict the terms which are expressly set out in the written contract.

The reason for this rule of law is that when persons have made a contract which is complete on its face, it is presumed that they have set out all their intentions in the written instrument. This is the reason that any conversations or agreements made at the time the contract is made are held to be improper, as showing the intentions of the contracting parties.

Architects, contractors, builders and all others who become parties to written contracts should therefore see to it that any contract which they execute is complete, and leaves nothing "understood" or to "be made all right" by the other parties. The word of another person may seem to be all right, but an express provision in a written contract that the other party is to do or is not to do a certain thing will be found from experience to be much better.

Every phase of any agreement should therefore be carefully covered in the contract. In addition, every difficulty and controversy which may arise should be anticipated as nearly as is possible.

Of course, parol evidence may be used to show that a contract is illegal, that it is incomplete, that the parties were incapable of contracting, or that there was fraud or collusion.

It may also be shown that it is subject to some condition before it is to become effective. So, too, technical words and expressions, or customs and usages of a trade, may likewise be explained or shown, or an obscure or ambiguous contract may be explained by parol evidence.

It must always be remembered, however, that the intention of the parties to a contract is controlling.

An Interesting Decision

If the location for a stone crusher was a location where stone could not be crushed, says the highest court of Massachusetts, it was not a "suitable location" within the meaning of a provision of a contract, which provides that a stone crushing plant is to be furnished.

All readers are invited to ask any questions whose solution will help them solve any legal difficulty that they may be in. Our legal adviser, George Kaiser, will answer direct by mail and give his opinion as to the correct procedure. Such of the questions and answers as are of general interest to the trade will be published in these columns.

All inquiries must be accompanied by the name and address of the correspondent, so that he may be answered direct or that he may be requested for further information if necessary to the intelligent answering of his question. No names will be published, only initials or a nom de plume. Remember that this service is free to subscribers.

Address Legal Department, Building Age, 243 West 39th Street, New York City.

In this case there was an express provision in the contract that a suitable location for a stone crusher was to be furnished. The Court held that the reason for a failure to furnish a suitable location was of no consequence if stone could not be crushed there, and in a case of this kind when an injunction is granted to neighbors just before operations are begun because the location of the plant is, without a doubt, a violation of the rights of persons in the neighborhood, there is a failure to perform according to the contract on the part of the person who agrees to furnish the "suitable location."

An Interesting Decision in the Lien Law

That a sub-contractor's right to a lien is not affected by a clause in the contract between the contrcator and owner which provides that the sum to be paid to the contractor on account of the cost of the owner's house is to be raised by a building loan, if the money is not so raised, is a decision in a recent New York case.

The Court held that, although the lien was subject to the contract, the sub-contractor need not believe that the owner would be relieved of all obligation to pay if the money was not raised by the building loan, and he was therefore justified in assuming that the contract did not make payment contingent on the owner's success in raising the loan.

Can Owner Be Sued When Architect Orders Material Without Owner's Sanction?

That when an architect has no right to make a contract in behalf of the owner of a building, for the installation of mail chutes in a building in the course of construction, the persons furnishing the mail chutes cannot sue and recover for them on the contract, was a decision in another recent case.

The parties who furnished the mail chutes claimed that a verbal contract had been made by the architect. The Court decided, however, that the architect had no powers under the contract other than those ordinarily given to supervising architects who are engaged in superintending the erection of a building, and that an architect's power in a case of that kind did not include the right to contract for articles such as mail chutes, which were not included.

Can Lien Be Obtained by Vendor of Portable Fixtures?

When a person furnishes and erects an asbestos curtain and scenery to be used for the purpose of a building, although they are not an essential part of the original plan of construction but are portable and will not pass with the freehold, he is not entitled to a mechanic's lien. This was decided by the Pennsylvania Courts in a recent case where suit was brought by the materialman against the owner of a building.

When Sub-Contractor Does Not Complete Work, Can He Be Sued?

In a California case which was decided just a short time ago it was held that where a contract between a principal contractor and a sub-contractor provides that if the sub-contractor should delay the work unreasonably the contractor might proceed with it after three days' notice to prosecute the work, no notice being required to authorize the contractor to complete the work where the sub-contractor entirely abandons it.

The fact that the owner of the building completed the job and deducted the cost

of completion from the amount due to the contractor was held to be proof that the principal contractor had been damaged to the extent of such deduction. It was therefore decided that he could recover such damage from the sub-contractor's bondsmen.

Correction on Precedence of Lien Over Mortgage

From C. E. D., Greenville, Ill.—Your legal department had an error in an answer to an Illinois inquiry which I consider should be corrected. Primarily under the common law the answer as appeared would be correct, but by statute this is altered in our state and also in some others. Your attorney is therefore correct only on general principles, and it is in fact impossible for any attorney to answer correctly as to specific cases in each state as to lien laws. They differ, and not only that one Supreme Court in one state will construe one section one way and other supreme courts another way. For instance, our Supreme Court holds a subcontractor can waive the lien of the materialman, though we have a statute saying he cannot, while other supreme courts hold directly the reverse as to this.

The correction I am sending you is authentic. Your answer in the June issue misstates the Illinois law on a vital point, and I am sending you the correct data so your attorney can, if he desires, correct the matter.

The Illinois Mechanic's Lien Law is as follows: "No incumbrance (mortgage) upon land created *before* or *after* the making of the contract under the provisions of this Act shall operate upon the building erected, or materials furnished until a lien in favor of the persons having done work or furnished material shall have been satisfied, and upon questions arising between incumbrancers (mortgagees) and lien creditors (lumberman) all previous incumbrances (mortgages) shall be preferred to the extent of the value of the land *at the time of making of the contract*, and the *lien creditor shall be preferred to the value of the improvements erected on said premises*, and the Court shall ascertain by jury or otherwise, as the case may require, what proportion of the proceeds of any sale shall be paid to the *several* parties in interest."

Such is the language of the Illinois statute. It means, to put it another way, that, for instance, an owner has a five-room house which is mortgaged for $1,000; he decides to erect another room as an addition. The man holding the mortgage has a first lien on the original five rooms, and the lumberman has a first lien upon the additional room, and this without reference to the date of the mortgage, no matter if it had been on the premises for years. The court when sale is made determines the relative value of the whole premises, as to original building and the additions, and dispenses the proceeds according to the ratio. The point is that the mortgage has the same security left to him he had before the improvement was made, and is not entitled to more, while the dealer is entitled to a first lien to the extent he has increased the value of the property, which is the addition built.

How Steep Should the Roof Be?

Prevailing Climatic Conditions and the Particular Material to Be Subjected to Those Conditions Are the Limiting Factors

By Ernest Irving Freese

Any roof-covering made up of a multitude of small overlapping pieces—such as shingles, slate or tile—is weather-tight in proportion to the steepness of the roof and the lap-over of its component parts. Obviously, the steeper the roof the better will it shed rain or snow and the less will be the liability of wind entering the joints between the overlapping pieces.

The roof might be of such a slope as to shed rain, but at the same time it might not be of sufficient steepness to shed rain quickly enough to avoid the possibility of moisture penetrating the joints by capillary attraction. Again, the roof might be steep enough to eliminate the latter possibility and yet not be of a steepness that would insure against the possibility of moisture penerating the joints by the force of the wind. Finally, the roof might have sufficient slope to bar the entrance of wind-blown rain, but still not be steep enough to shed snow.

The above facts serve to introduce the one basic but oft-neglected principle of roof construction, namely: the roof should be sufficiently steep to meet the worst possible condition to which it might be subjected.

In a tropical or sub-tropical clime snow has not to be reckoned with; therefore, in this case the worst possible condition would be a copious rain coupled with a strong wind. On the other hand, in a wintry clime the worst possible condition might be either a heavy fall of moisture-surcharged snow or a light fall of drifting wind-driven snow. Experience demonstrates that wind-driven snow will penetrate where rain will not. Experience also proves that a roof subject to either of the snowstorm conditions requires a steeper slope than one under the rainstorm condition, other things being equal.

Under the rainstorm condition a shingled roof ought not to be of lesser vertical rise than 5-24ths of the horizontal span. This should be considered the minimum. Now, as has been said, the lap-over of shingles, slate or tile upon one another, under this particular condition, is a measure of the weather tightness of the roof. Shingles are laid with more lap-over than slate, and slate with more lap-over than tile; therefore, as regards the minimum steepness for the same degree of weather-tightness, it follows that a tile roof should be steeper than a slate roof, and the latter steeper than a shingled roof. It would be a wise precaution, then, never to decrease the following minimum vertical heights of roofs in a non-wintry clime:

Shingled roofs, 5-24ths of the span.
Slate roofs, 6-24ths of the span.
Tile roofs, 7-24ths of the span.

In a wintry clime not only the rainstorm conditions, but also the snowfall conditions have to be reckoned with. In this case the surface smoothness of the covering is a measure of the snow-shedding property of the roof; therefore, as regards the minimum steepness solely to facilitate the riddance of snow, it follows that a shingled roof should usually be steeper than a tiled roof, while a tiled roof should be steeper than one of slate. But this order of relative steepness is not the same as that required for the rainstorm condition. For instance, to exclude windblown rain, a slated roof must be steeper than a shingled one, yet, to shed snow readily, the shingled roof must be the steeper. Here, then, an average must be struck. So, considering both snow and rain, and regarding any one of the three above-named roofs, it would be well never to limit the rise to less than one third the span for roofs in a wintry clime.

Finally, let it be said, there exist only two plausible reasons for restricting a roof to its minimum rise: architectural treatment and so-called economy. While plausible, these reasons are not altogether logical, for, first and always, the function of a roof is to afford adequate protection from the weather. If architecture interferes with this function, then it is poor architecture. If economy restricts it, the economy is assuredly far-fetched. So, in determining how steep the roof should be, it would seem that here, as in other practical matters, a certain "factor of safety" should be allowed.

A Comfortable House of Colonial Type

This House Has Two Bath Rooms, Which Is An Unusual Feature In the Small House

The living room, looking toward the French windows, which open on the rear porch. Note the high windows, which afford light and yet do not interfere with wall space for furniture.

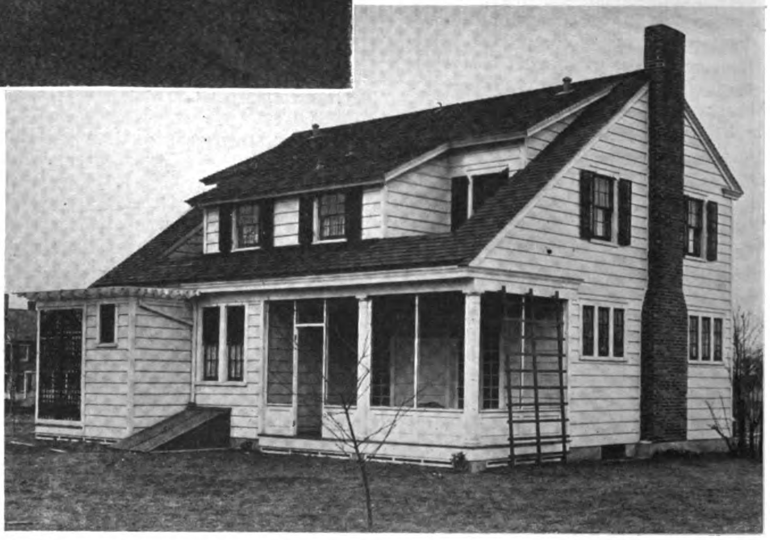
A type of house which is returning more and more into favor is the simple and dignified Colonial. The modern uses which are being made of this style of architecture afford opportunity for infinite variety and originality, combined with a background of historic interest and charm. The term "Colonial" itself has come to have a wide range of meaning and to stand for several distinct and widely varying types. Chief among these are the Southern Colonial, with its spacious and hospitable arrangement, lofty and generous columns marking the entrances and verandas; the low and comfortable Dutch Colonial, with its quaint roof treatments—the overhanging gambrel roof, or the beautifully curved, low roofs of the story-and-a-half houses; and the more restrained and dignified New England Colonial.

It is in the New England Colonial house, however, that the greatest conformity to original type is to be found. That is to say, what is known as pure Colonial is embodied more completely in this type than in the others. The adaptations from the Georgian, the severity and restraint of Puritan days, the simplicity and charm induced by simple, wholesome lives are all to be found in the New England colonial house.

In modern times this type of design has been used freely, with varying degrees of success. The house shown in the accompanying illustrations is an admirable example of good adaptation. Although this house is small and unpretentious, all the essential elements of successful and accurate design are present, so that the house is more than reminiscent of the days of our New England ancestors.

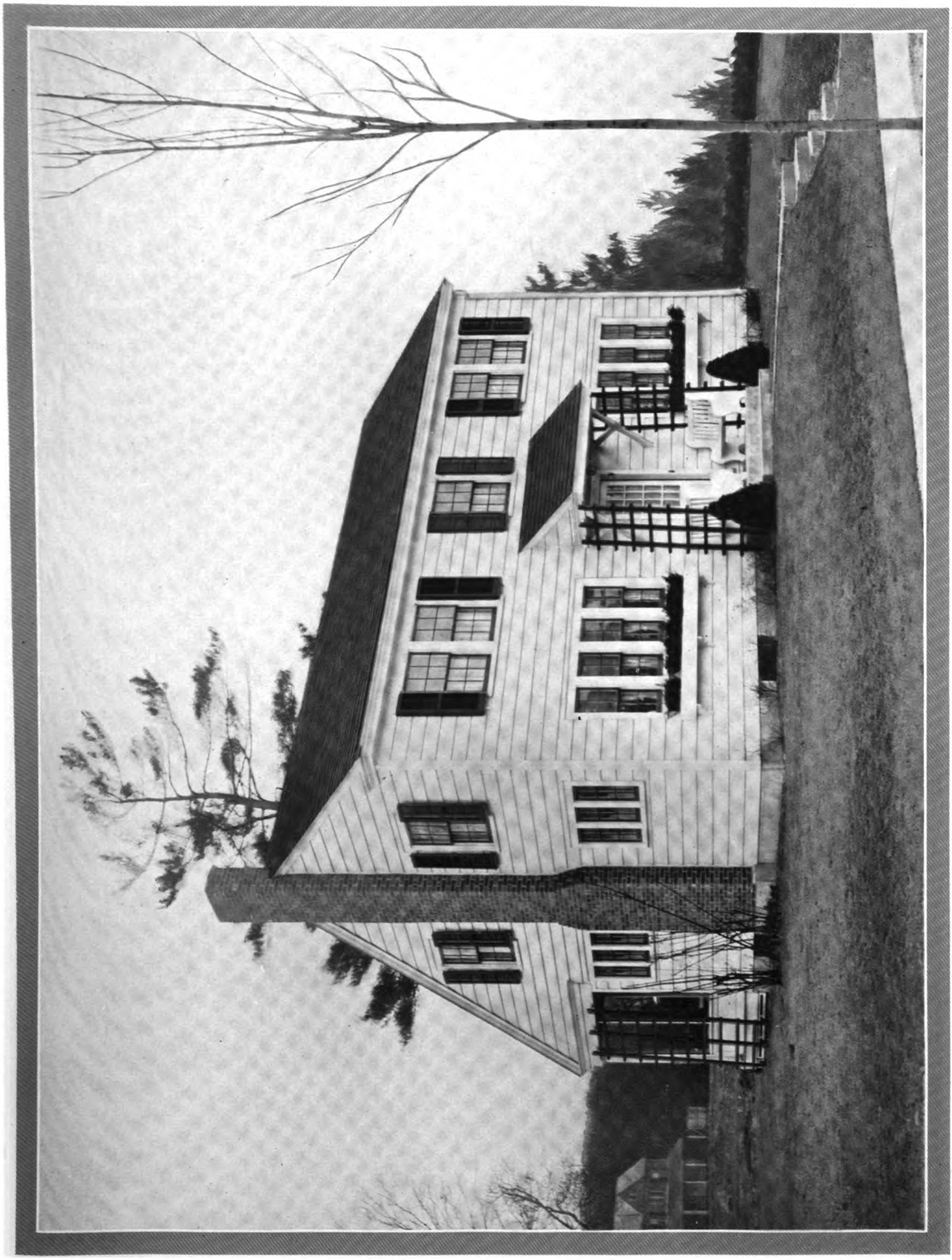
There is no display of mouldings, cornices or ornate porticoes and the like to be found here, but there is charm in the sturdy, simple proportions and in the restful quiet of the entire design. Interest and originaliy are established through the irregular roof line, the simple cornice, which cuts back at the roof line, forming a return. This varies in size at the four corners of the house, as will be seen from the photographs, particularly that showing the rear porch, where the moulding returns to form the cornice of the end of the porch.

The living porch, as will be seen from the plan, is at the side of the house, where there is a southeast exposure. French windows open on it from the living room, which extends along the east side of the house. One central hall serves the combined purposes of entrance, passage and stair hall. Just opposite is the dining room, which opens into a large pantry, equipped with sink and dresser. The maid's room is reached from the pantry. The kitchen is large and well equipped with sinks, dressers and closets. A small passage gives entrance to the basement stairway. There is also a bulkhead entrance from the outside, as will be seen from the plan.



The back of the house in interesting, the roof being attractively broken up.

The feature of the second floor is the fact that there are two bath rooms, an



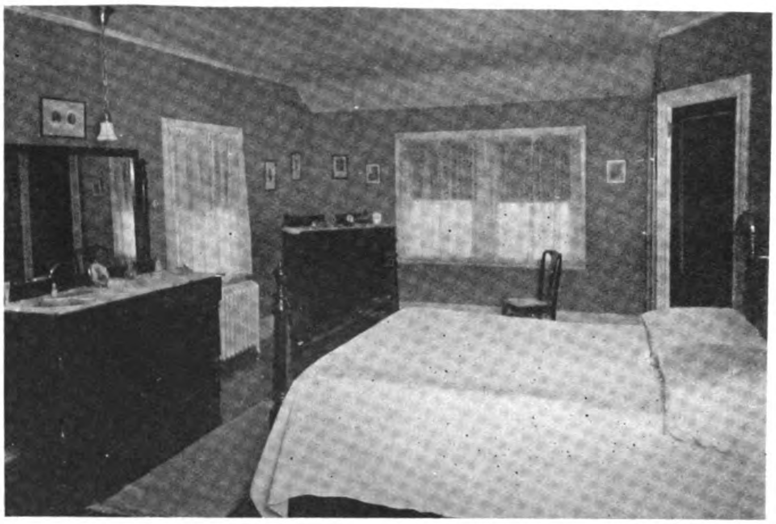
arrangement all too rare in houses of this size. The tendency to-day is more and more towards more sanitary arrangements, and there is every possibility that the one bathroom house will eventually become extinct. In fact, the two bath rooms in this house was the greatest factor in making the sale to its present owners. There is a large owner's bath, and another beside it which serves the two bedrooms on the opposite side of the house.

The photographs of the interiors show how fully and attractively each room has been developed.

In general the construction of this dwelling conforms closely to ordinary practice. The footings were 12 in. thick and 6 in. wider on each side than the wall they supported. The footings for iron columns were 28 in. x 28 in. x 12 in., of concrete in a 1:3:5 mix. The foundations were of 12 in. concrete, in the same mixture as for footings, poured in wood forms. The cellar was given a concrete floor, 2 in. of concrete of the same mixture as for foundations being placed over 3 in. of well tamped steam cinders. A top dressing of cement, 1:2½ was laid over the concrete.

There is only one chimney in this house; it is built up along the east wall, exposed all the way. There is a fireplace in the living room served by it, as well as the furnace in the basement. The chimney is built of brick and lined with unglazed flue tile, 8½ x 8½ in. and 8 in. x 12 in.

The framing is very much the same as that usually employed in a house of this type, there being no difficulties or peculiarities in construction. Siding ¾ in. x 10 in. of No. 1 beveled red cedar was used for the exterior, laid 9 in. to the weather. The cornice was made up of a crown moulding, ⅞ in. x 4½ in. sprung, a bed moulding ⅞ in. x 2 in., and fascias, coronas and planciers ⅞ in. thick. Two coats Atlantic white lead and oil were used for exterior painting.


One of the bedrooms. The trim is exceptionally simple and helps keep household work at a minimum.

The roof was covered with 1 in. x 2 in. spruce lath, over which was laid 18 in. random red cedar shingles, laid 5½ in. to the weather.


The dining room.


The living room, looking toward the front of the house.

The floor of the living porch is of concrete; 6 in. of steam cinders were laid first, followed by 3 in. of concrete, 1:5 mix, with a top dressing, 1 in. thick, of cement, colored red.

The front door was of 1¾ in. pine. The interior doors were of 1⅜-in. two-paneled birch. Sash doors of first quality D. S. A. glass, as were the windows throughout.

All interior trim, including the stairs, was of basswood, finished in the living portions of the house with one coat shellac, two coats flat white paint and one coat flat enamel. The service portions were given one coat filler and one coat varnish. All doors in living portions were stained mahogany, then given one coat shellac and one coat flat varnish. This finish was also applied to stair rails.

The walls were given three good coats of plaster, and the house was then papered throughout, with the exception of bathrooms and kitchen. The former was given a wainscot treatment, the lower section being painted two coats of enamel paint and finished with a wainscot crown mould. The upper section of wall was given two coats of flat paint.

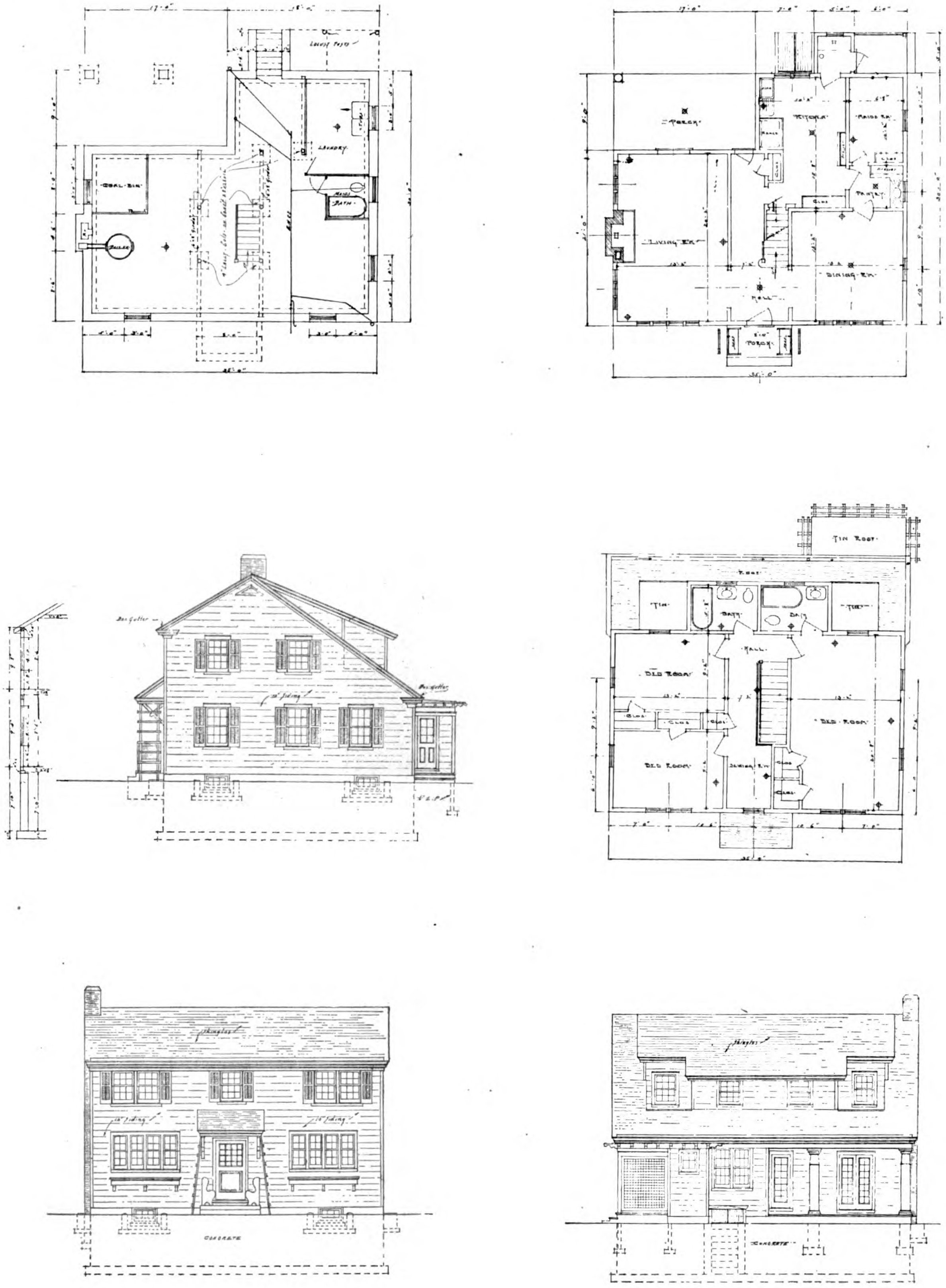
The bathroom floor is of white tile, 1 in. hexagon tile being used; there is a 6-in. white sanitary base.

The floors in first and second stories are of ⅞ in. x 2½ in. No. 1 N. C. C. G. pine, finished with two coats of shellac, one coat of wax. The kitchen floor was given two coats of heavy varnish. Stair treads were filled and varnished.

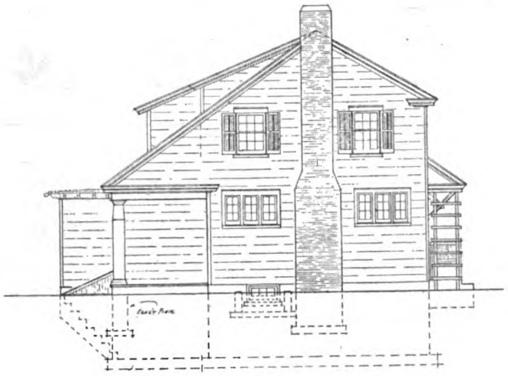
The jambs of the living room fireplace in this house were of good wire cut brick. The fire opening was backed with fire bricks. A simple Colonial mantel of good design surmounts it.

Electric lighting was used in this house, and hot water heating.

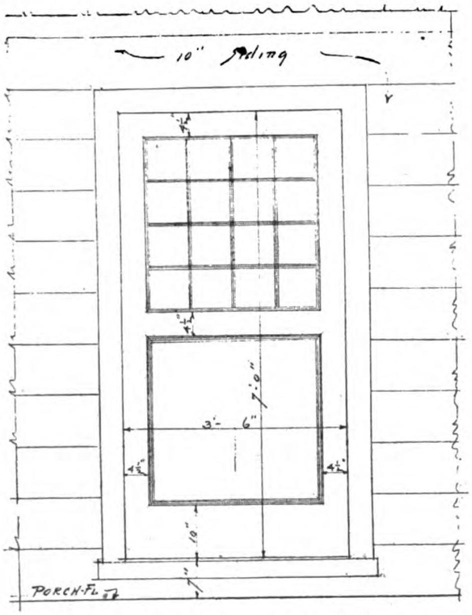
This residence was built at Flushing, L. I., N. Y. Mr. F. Johnson, 46 Prospect Avenue, Flushing, N. Y., was the architect for the work.



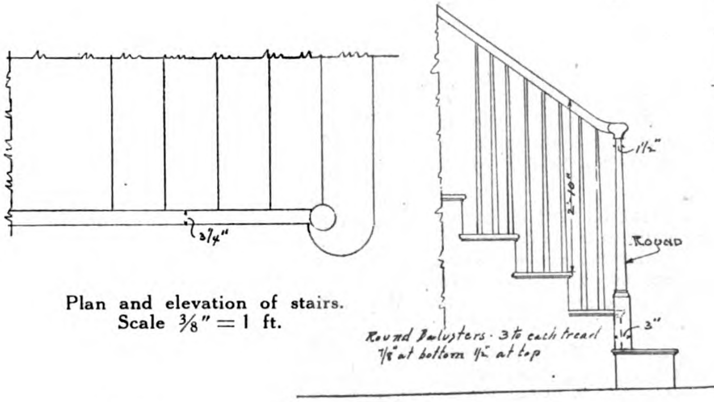
Floor plans and elevations. Scale 1/16″=1 ft.



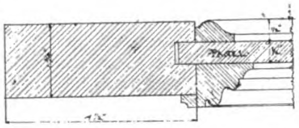
Side elevation. Scale 1/16" = 1 ft.



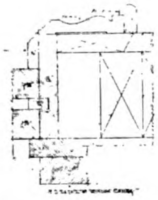
Elevation of front door. Scale 3/8" = 1 ft.



Plan and elevation of stairs.
Scale 3/8" = 1 ft.



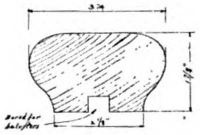
Detail at front door. Scale 3" = 1 ft.



Detail of window casing. Scale 1/2" = 1 ft.

Detail of window stool and apron.

Detail of picture mold.



Detail of handrail Scale 3" = 1 ft.

Detail of base.

The Way to Shingle a Boston Hip

By John Upton

The best way to finish up a hip on a roof is what is known as the "Boston Hip."

To shingle this you measure out four inches each way from the corner of the hip and snap a line the entire length each side, then bring the corners of the straight regular shingles to this line.

Use a short straight edge to mark the four inch line on each shingle as it is laid, so as to show where the next one should come. The first two courses are laid way out to the corner and mitered. The hip shingles are put on top of these, the first one being cut off with a chisel so that the next one will lay down close to the roof. The second one is put on and cut on a bevel to match the first one. The edges are nailed together but all other nails are so placed that they will be covered.

Bring the corners of the hip shingles even with the bottom line of the straight ones. Where the tops extend above the hips they must be cut off.

The tops of the hip shingles must be cut to fit against the sides of the straight ones. The edge follows the line from the corner of one shingle to that of the next.

Hips may be put on as the work proceeds, a few at a time, or they may be left and the entire hip shingled at once. It is less tiresome to finish as you go along.

Hips may be laid from each side, alternating, or so that the prevailing winds will not tend to blow them off.

If you do not fully understand shingling hips and valleys get a few shingles and fasten two short boards together, so as to make a hip or valley when turned over, and learn by actually doing the work.

The courses must be kept even on the two sides, or you will have trouble in keeping the butts of the shingles square with the hip and it may be that you will have some trouble here anyway and have to cut some to fit.

THE EDITOR'S PAGE

Good Results Can Be Expected from the Atlantic City Convention

Encouraging, to say the least, was the formation at Atlantic City of an organization to forward the interests of the building industries. The board to be maintained at Washington will undoubtedly be able to do much good.

The building industry is one of the greatest factors in the prosperity of this country. Its employment of capital and labor is tremendous in its widespread scope. Filling, as it does, one of the fundamental human wants it deserves and must receive every possible help and encouragement in weathering the present emergency.

When the first great call for men was made, it was the building industry which made possible the rapid assembling of the troops who are now turning the tide "over there." Only through the remarkable speed of cantonment construction was quick mobilization and training possible.

The first great stress of government requirements is now over. As regards the winning of the war, the building industry is now lending its greatest talents to the industrial field, building factories and housing the workers.

This is as it should be. No patriotic American could wish for any obstacle to be placed in the way of such essential construction. But the dearth of apartment houses, office buildings, and homes for both the war and non-war worker is such that immediate steps should be taken to meet the crying demand.

The board at Washington has a chance to present all facts concerning the building industry to the War Industry Board. There has often heretofore been a startling lack by the government of any understanding of such facts. A greater coordination between the representatives of the government and the building industry is to be hoped for as the logical outcome of the convention at Atlantic City.

Plans for Spending $60,000,000 for Housing

The Government is going to spend plenty of money for housing, but this money is going to be used carefully and with due regard for established business principles. The $60,000,000 fund is to be spent along the following sound lines, recently announced by Secretary of Labor Wilson:

There shall be organized a management division which shall undertake the management of the properties erected by the government and also a division of existent housing which will deal with the question of utilizing all of the housing and boarding facilities of such community in order to reduce to a minimum the need for government housing.

The government will build, own, control, and rent the houses until after the war.

Houses erected in established communities shall be of a permanent character except where Congress has otherwise stipulated.

Houses erected in communities that are not likely to continue in existence after the war shall be of a temporary character, but such temporary buildings must, of course, provide for the comfort of the occupants.

Loans will be advanced for the erection of dormitories only to responsible corporations or associations not organized for profit, and then only after most careful consideration of the advantages to be gained thereby.

In fixing rentals the following factors will have to be taken into account: Fixed charges, interest on investment, insurance, reserve for up-keep of rented houses, repairs, renovating and redecorating, reserve for loss in case of non-occupancy, overhead expenses of administration and depreciation.

Architects' Advertising Endorsed *By A. I. A.*

A hopeful sign of architectural progress is to be seen in the new attitude of the American Institute of Architects towards advertising. The abolition of the particular canon of ethics forbidding advertising is a step in the right direction, for the architectural profession needs not only the advertising of the individual but also the advertising of the profession as a whole.

The attitude of the American Institute of Architects has undoubtedly been too uncompromising, too dignified, and too far removed from the every day necessities of the profession.

What is an architect? What is his function in the world of building? Is he a mere parasite, resurrecting ancient design, an unpractical dreamer of pretty pictures? The average man would give quick assent to the last question. An architect means little or nothing to him. He understands absolutely nothing of the problems which an architect solves, problems that need a wide practical and technical knowledge for proper solution.

The profession would be benefited and given much higher standing in popular opinion, if the Institute would start a campaign of popular education. Such propaganda is needed and should form one of the largest fields of endeavor for the efforts of the Institute.

A short time ago the Institute formulated a set of standard symbols for indicating on drawings the various kinds of materials. Satisfied with having adopted the set, the Institute made no effort to secure its use. Naturally, the need for a standard method of indicating various materials is as great as it was before the Institute acted.

Great as is the necessity for the individual advertising of the architect, yet still greater is the necessity for a strong, aggressive campaign of architects as a body, which will give the profession the high popular standing that it deserves and should have.

Write News of the Trade to Your Friends at the Front

Have you any friends who are with the boys at the front? Help cheer them up and keep them in touch with trade activities in the home town.

When the folks at home write, they usually stick to things which have a direct bearing on the family life. The boys need that; they are hungry for it. But they also like to hear what Jake Brown and the rest of their associates and co-workers are doing. The family letters can't give that news, it's only the men who have worked on the job with the soldier boy who can pass on the gossip of the trade.

You know how you yourself like to hear what's happened among the boys when you've been away for a short time. There's always the pleasant, chatty gossip that leaves you with a comfortable, cheery feeling.

Have you ever watched the boarders at a summer hotel rush for the mail when it comes in? The eager, expectant faces that happily tear open an expected missive? Those passed by stand disappointed, or try to share some of the pleasure of one more fortunate.

Help to keep the boys at the front from disappointment. Put cheery, pleasant gossip of the trade into your letters for the A. E. F. Remember that through you the boys will keep in touch with building. It's been their past, and it will likely be their future.

Help keep up their spirits today and aid them to prepare for the future when peace comes. It's a good turn you'll be doing them.

Building Activity Throughout the United States

Little new can be said concerning the causes for the continued falling off of building construction throughout the country. The pressure of government requirements and various difficulties encountered continue to hold up all but the most necessary projects. New construction therefore either represents work that can no longer be put off or else represents work essential to the winning of the war.

The efforts at the Atlantic City convention to bring the government to greater understanding of the essential nature of the building industry is going to be of value. It is to be hoped that increased activity will result.

The country shows a loss of 25 per cent for June, 1918, compared with June, 1917, 158 cities reporting, the amount of new and repair work totaling $45,606,644 as against $63,951,611. Eastern cities report a loss of 44 per cent, middle cities of 20 per cent and Southern cities a loss of 19 per cent. It is encouraging to note that the Western cities report a gain of 25 per cent.

CITIES IN EASTERN STATES

	June, 1918				June, 1917			
	New Work		Repairs		New Work		Repairs	
	Permits	Value	Permits	Value	Permits	Value	Permits	Value
Albany, N. Y	203	$105,245	...	....	178	$173,615	...	....
Allentown, Pa	21	119,925	...	....	27	47,870	...	....
Altoona, Pa	10	5,980	44	16,991	3	2,378	30	17,639
Atlantic City, N. J	10	14,775	61	20,101	7	35,246	65	11,215
Amsterdam, N. Y	29	13,350	...	....	50	38,200	...	....
Auburn, N. Y	13	37,350	...	....	24	63,200	...	....
Bayonne, N. J	22	184,600	...	....	23	228,470	...	....
Binghamton, N. Y	53	15,443	98	15,307	70	49,984	155	27,014
Boston, Mass	52	741,640	337	424,658	108	2,053,374	338	431,577
Bridgeport, Conn	89	241,655	...	....	153	744,915	...	....
Brockton, Mass	10	7,385	10	15,150	28	106,435	26	68,275
Buffalo, N. Y	307	592,200	91	94,800	447	1,344,000	...	....
Camden, N. J	33	169,995	...	....	47	100,542	...	....
East Orange, N. J	44	97,104	...	....	38	118,405	...	....
Elizabeth, N. J	31	98,435	...	....	34	104,088	...	....
Erie, Pa	119	275,925	...	....	142	519,036	...	....
Fall River, Mass	32	65,780	...	....	42	117,250	...	....
Harrisburg, Pa	21	28,800	...	....	29	792,805	...	....
Hoboken, N. J	7	216,450	17	10,784	2	1,400	15	9,093
Holyoke, Mass	10	26,750	4	21,075	18	104,700	8	18,325
Lawrence, Mass	19	417,218	8	11,650	16	36,425	12	13,580
Lancaster, Pa	16	3,580	...	....	5	10,450	...	....
Manchester, N. H	60	27,720	...	....	79	151,187	...	....
Mount Vernon, N. Y.	16	29,515	9	15,715	20	97,475	17	57,115
Newark, N. J	163	580,921	...	....	226	1,208,817	...	....
New Bedford, Mass	40	68,150	...	....	31	478,075	...	....
New Britain, Conn	21	139,250	40	27,035	24	86,980	23	12,770
New Haven, Conn	101	179,012	...	....	115	220,475	...	....
New York:	29	269,300	114	69,218	35	424,700	254	183,758
Manhattan	25	1,215,100	255	1,038,589	31	806,725	365	1,378,618
Bronx	203	333,518	...	....	289	608,458	...	....
Brooklyn	192	1,522,827	790	476,757	167	7,435,900	913	469,566
Queens	641	479,850	...	....	647	1,123,175	...	....
Richmond	93	114,461	...	....	101	254,178	...	....
Niagara Falls, N. Y	38	122,140	...	....	68	160,331	...	....
Nutley, N. J	7	7,245	1	10	8	8,265	2	25
Passaic, N. J	9	24,100	8	3,140	38	151,420	14	6,000
Paterson, N. J	98	133,309	...	....	87	127,447	...	....
Philadelphia, Pa	333	1,392,690	361	279,210	393	2,069,345	370	259,410
Pittsburgh, Pa	285	1,280,594	...	....	381	976,259	...	....
Portland, Me	16	10,720	14	8,120	31	44,785	23	24,475
Quincy, Mass	82	147,038	...	....	86	157,913	...	....
Reading, Pa	17	60,700	116	24,050	41	104,500	124	40,950
Rochester, N. Y	88	271,295	74	22,120	134	432,497	92	127,535
Schenectady, N. Y	51	76,600	23	7,640	45	134,396	45	12,090
Scranton, Pa	20	43,085	...	....	34	137,290	...	....
Springfield, Mass	79	132,900	...	....	109	424,125	...	....
Syracuse, N. Y	65	46,150	85	124,073	82	253,005	96	57,988
Trenton, N. J	30	55,595	...	....	417	71,017	...	....
Salem, Mass	31	34,984	...	....	11	17,303	...	....
Troy, N. Y	17	37,200	15	37,200	35	50,400	...	....
Utica, N. Y	23	156,875	8	22,500	28	94,050	12	39,770
Wilkes-Barre, Pa	69	56,527	...	....	82	35,346	...	....
Woonsocket, R. I	23	24,942	...	....	26	77,055	...	....
Worcester, Mass	149	308,409	...	....	181	478,877	...	....
York, Pa	37	6,530	...	....	48	13,038	...	....
Chelsea, Mass	14	43,375	...	....	12	34,140	...	....
Fitchburg, Mass	20	20,275	...	....	21	72,360	...	....
Lowell, Mass	53	174,870	...	....	14	52,810	...	....
Malden, Mass	22	81,775	...	....	27	167,250	...	....
Yonkers, N. Y	..	253,600	...	....	...	207,900	...	....
	4399	$13,452,732	2583	$2,785,983	5755	$26,242,057	2999	$3,266,748

CITIES IN MIDDLE STATES

	June, 1918				June, 1917			
	New Work		Repairs		New Work		Repairs	
	Permits	Value	Permits	Value	Permits	Value	Permits	Value
Akron, Ohio	203	$780,605	79	$31,945	370	$847,000	109	$67,970
Canton, Ohio	106	205,615	...	....	67	160,235	...	....
Cedar Rapids, Iowa	25	153,000	...	....	34	114,000	...	....
Chicago, Ill	277	4,062,500	1122	280,125	402	4,630,400	...	....
Cincinnati, Ohio	925	474,895	...	....	1183	658,940	...	....
Cleveland, Ohio	168	1,276,400	737	292,400	395	2,409,800	879	438,750
Columbus, Ohio	104	249,995	94	79,875	129	418,345	68	52,165
Davenport, Iowa	92	90,476	...	....	86	66,775	...	....
Dayton, Ohio	101	378,837	25	16,275	99	273,719	...	....
Des Moines, Iowa	66	143,099	...	....	86	161,893	...	....
Detroit, Mich	898	3,017,975	...	....	1337	3,679,145	...	....
Dubuque, Iowa	3	2,680	...	....	9	22,000	...	....
Duluth, Minn	76	143,940	72	67,182	105	184,258	95	58,783
East St. Louis, Ill	25	166,925	...	....	34	33,430	...	....
Evansville, Ind	18	9,135	45	7,424	19	52,975	54	11,503
Grand Rapids, Mich	108	91,580	...	....	134	174,558	...	....
Indianapolis, Ind	420	541,651	...	....	448	720,705	...	....
Jackson, Mich	59	54,126	...	....	51	100,900	...	....
Kansas City, Kan	30	97,475	...	....	48	196,670	...	....
Kansas City, Mo	24	494,600	136	204,220	80	531,300	291	92,350
Lincoln, Neb	41	145,951	...	....	22	50,305	...	....
Milwaukee, Wis	301	755,797	...	....	342	684,920	...	....
Decatur, Ill	33	54,960	...	....	48	94,876	...	....
Hamilton, Ohio	17	24,290	...	....	23	16,153	...	....
Minneapolis, Minn	354	490,235	...	....	431	756,300	...	....
Omaha, Neb	83	467,650	...	....	78	624,830	...	....
Peoria, Ill	26	103,430	...	....	37	116,625	...	....
Quincy, Ill	2	6,800	...	....	6	24,700	...	....
Richmond, Ind	15	6,135	10	4,598	7	12,800	14	2,000
Saginaw, Mich	22	22,309	...	....	39	46,880	...	....
St. Louis, Mo	217	683,913	354	207,950	242	725,030	562	185,964
St. Paul, Minn	186	276,696	...	....	321	687,429	...	....
Sioux City, Iowa	35	139,150	...	....	56	265,275	...	....
South Bend, Ind	381	279,294	...	....	616	1,214,735	...	....
Springfield, Ill	19	39,600	30	23,625	12	27,550	32	19,075
Superior, Wis	101	57,285	...	....	123	64,904	...	....
Terre Haute, Ind	36	33,375	39	24,080	44	29,420	...	....
Toledo, Ohio	147	507,534	...	....	322	534,523	...	....
Topeka, Kan	24	27,645	...	....	30	70,840	...	....
Wichita, Kan	78	419,350	...	....	63	243,470	...	....
Youngstown, Ohio	108	408,042	30	34,525	158	825,825	14	9,850
Joliet, Ill	12	35,000	...	....	7	24,000	...	....
Springfield, Mo	27	16,525	...	....	21	79,550	...	....
	6083	$17,066,535	2773	$1,274,224	8164	$22,658,024	1918	$943,390

CITIES IN EXTREME WESTERN STATES

	June, 1918				June, 1917			
	New Work		Repairs		New Work		Repairs	
	Permits	Value	Permits	Value	Permits	Value	Permits	Value
Boise, Idaho	2	16,800	20	9,130	2	14,900	11	5,330
Berkeley, Cal	8	24,000	57	27,000	16	114,000	52	21,500
Colorado Spgs., Col	8	2,515	11	2,870	10	18,720	9	3,175
Denver, Col	90	164,900	98	60,700	98	173,600	107	46,800
Los Angeles, Cal	509	778,680	505	196,638	505	969,742	213	191,451
Oakland, Cal	127	511,077	76	78,346	118	312,875	73	49,509
Pasadena, Cal	27	60,512	47	26,739	28	31,121	44	14,086
Portland, Ore	263	366,300	243	104,930	134	377,320	137	66,925
Pueblo, Col	56	41,692	....	....	34	33,490	...	....
Salt Lake City, Utah	68	165,815	...	....	79	214,635	...	....
San Diego, Cal	38	83,895	36	14,298	29	17,005	35	7,831
San Francisco, Cal	72	880,541	291	234,798	104	604,559	285	185,000
San Jose, Cal	29	69,087	...	....	20	13,494	...	....
Seattle, Wash	976	1,023,525	...	....	557	371,260	...	....
Spokane, Wash	46	9,820	24	3,330	45	271,410	35	122,430
Stockton, Cal	71	219,184	...	....	48	71,216	...	....
Tacoma, Wash	172	193,899	96	46,3 4	62	98,65	28	19,905
Long Beach, Cal	223	333,679	...	....	50	41,041	...	....
Fresno, Cal	38	91,515	32	6,680	37	83,496	45	11,210
Eureka, Cal	2	3,000	4	900	10	12,300	7	2,500
	2825	$4,940,436	1257	$812,063	1986	$3,834,834	1081	$747,652

CITIES IN SOUTHERN STATES

	June, 1918				June, 1917			
	New Work		Repairs		New Work		Repairs	
	Permits	Value	Permits	Value	Permits	Value	Permits	Value
Augusta, Ga.	53	$45,230	...	....	96	$76,233	...	....
Atlanta, Ga.	112	397,438	82	51,765	251	590,456	151	73,121
Baltimore, Md.	84	111,885	627	205,500	65	242,460	644	170,436
Beaumont, Tex.	61	168,214	23	4,363	35	84,253	36	19,479
Birmingham, Ala.	208	73,158	...	....	316	79,504	...	....
Charleston, S. C.	15	30,625	...	....	20	29,860	...	....
Charlotte, N. C.	15	99,000	9	17,825	17	71,727	...	....
Chattanooga, Tenn.	131	18,925	...	....	141	49,738	...	....
Covington, Ky.	10	4,500	...	....	32	23,950	...	....
Dallas, Tex.	45	174,291	...	....	64	300,365	...	....
El Paso, Tex.	87	58,727	...	....	144	300,365	...	....
Fort Worth, Tex.	71	242,985	...	....	37	310,080	...	....
Jacksonville, Fla.	39	38,365	...	....	67	74,877	...	....
Houston, Tex.	174	125,626	...	....	216	141,709	...	....
Huntington, W. Va.	33	60,930	...	....	47	333,084	...	....
Louisville, Ky.	100	151,336	37	27,176	70	132,830	48	19,830
Memphis, Tenn.	48	150,607	...	....	104	159,555	...	....
Miami, Fla.	61	198,700	...	....	73	142,015	...	....
Montgomery, Ala.	92	23,396	...	....	72	22,728	...	....
Nashville, Tenn.	362	76,140	...	....	347	57,064	...	....
New Orleans, La.	32	139,650	2 3	22,131	48	188,621	12	24,660
Oklahoma City, Okla.	66	254,272	...	....	74	249,265	...	....
Richmond, Va.	22	94,585	66	103,963	48	116,544	57	95,115
San Antonio, Tex.	238	215,920	...	....	134	171,634	...	....
Savannah, Ga.	15	17,225	...	....	3	32,990	...	....
Galveston, Tex.	304	14,763	...	....	92	9,605	...	....
Knoxville, Tenn.	85	54,902	...	....	120	47,742	...	....
Washington, D. C.	51	602,160	317	153,305	94	1,515,005	324	320,193
Wilmington, Del.	84	404,756	62	47,728	19	82,569	49	46,936
Corpus Christi, Tex.	5	600	...	....	12	7,625	...	....
Lexington, Ky.	57	84,110	...	....	25	37,760	...	....
Portsmouth, Va.	23	49,445	...	....	14	29,165	...	....
Roanoke, Va.	24	9,835	...	....	28	17,475	...	....
Wheeling, W. Va.	64	18,714	...	....	45	27,288	...	....
	2871	$4,211,015	1246	$1,063,056	2997	$5,489,136	1321	$769,770

Selling Lumber by Real Salesmanship

Some Timely Suggestions by a Traveling Salesman Which Will Help You Sell More Lumber

By Frank Kneisley

"One day when making my initial call at a line yard in a country town," said a traveling salesman to me recently, "the local manager was talking his head off and otherwise doing his best to sell a prospective customer enough oak flooring to lay his kitchen floor. I sat my grip down and took a seat in the outer office, which was separated from the private office by a highly varnished spindled railing about four feet high. I fumbled over three or four upopened lumber journals and a pile of the local weeklies scattered promiscuously and untidily about on a dust-covered table near-by, presently picking up a late number of the local weekly, which I pretended to be absorbing while waiting for the manager to finish with his customer, who was a prosperous looking farmer and evidently a close buyer. Most of them now-a-days are prosperous and close buyers. I wasn't much interested in the paper I was scanning over. The psychology of that sale, or attempted sale, of a small bunch of oak flooring appealed to me far more than a dreary and uninteresting effusion of a weekly paper. The manager and farmer were having a good deal to say. Two minutes of their dialogue and I knew how the thing would end. Just like a poorly written story or scenario—the first chapter or two or the first reel and the whole plot is laid bare. You can see the finish before the story has a good start.

"That was the way with the yard manager and the farmer. My own experience and training as a salesman intuitively told me that the sale of the oak flooring was lost. I knew the farmer wanted to buy the flooring but the manager wasn't going to sell it. I knew it from the line of questions the farmer was firing at the manager and the unsatisfactory answers he was getting back. The manager's line of talk didn't seem to be getting over; it lacked something. The farmer grew listless and had lost interest in what the manager was saying and was looking for a chance to end the matter and get away. And sure enough he did—suddenly and abruptly, and left without making the purchase.

"Their conversation had developed into an argument about the time I entered the office. The manager had quoted a price of $85 per 1000 feet for the flooring and the price had evidently given the farmer a nervous shock and with it some grave suspicions of high-handed robbery. During the argument the manager, endeavoring to justify his quotation, referred somewhat sarcastically to the exorbitant prices the farmers were getting for their products, which doesn't set very well with most farmers. So this particular farmer grew quite truculent and said a lot of mean things to the manager. He left the office in a bad frame of mind and probably suspicious of his home lumberman.

"'What do you think of that?' the manager asked me when the farmer had left the office. 'There's a sample of what we lumbermen have to contend with,' he continued, before I was allowed to answer his question. 'That's the way with the farmer—he expects and demands the top price for everything he sells and considers it all right to get high prices himself, but when he is asked to pay a small advanced price for anything he wants to buy we are classed as crooks and hold-ups.'

"'How much flooring did he want?' I asked the manager.

"'Enough to floor his kitchen,' he replied.

"'How much flooring would it require for his kitchen?'

"'I don't know exactly; I didn't ask him the size of his room. But I guess it is about 12 x 14 feet; that's about the

average size of most of the farmers' kitchens.'

"'Well, how much flooring would he have to have to cover a room of that size?' I rather insisted.

"With pencil and paper he made some rapid calculations.

"'About 250 feet,' answered the manager, in a tone that made me feel he wasn't sure as to the exact amount.

"'What would it cost to lay and finish that amount of flooring?' I asked him.

"'Well, as to the cost of laying and finishing, I don't know.'

"He appeared embarrassed. He disliked to have me know that he wasn't so well posted on hardwood floors. And my last question must have ruffled him some, for he added very tartly that the cost of laying hardwood floors was up to the carpenter and painter and not the dealer's business to make estimates on such work as hardwood floors.

"I didn't want to get into any argument with that manager or offer any suggestions, seeing he wasn't going to accept any of my suggestions if I offered them. It was my first call and I realized that a little tact on my part was better than advice or suggestions from a stranger.

"'Well, maybe you are right about that; these farmers are a peculiar set of fellows,' I said agreeably in closing the incident. Then I proceeded with my own business.

"One month later I again called on that manager. He greeted me with a pleasant smile and a friendly handshake. We got pretty well acquainted during that call and he gave me a very decent sized order.

"'By the way, did you sell our farmer friend the oak flooring?' I asked smilingly, after we had talked along a while.

"'Well, sir,' replied the manager, 'he made a deal with a local contractor to furnish the flooring and lay it for a lump sum; and believe me, that farmer paid dearly for it. The contractor bought the flooring from a mail-order house.'

"And then he paused a moment, looked straight at me and smiled a sort of half-guilty smile. He wanted to tell me something, but seemed to be debating whether he should or not.

"'It never dawned on me what you were driving at when you were here before and asked me about the cost of laying that farmer's oak flooring,' he continued, somewhat backwardly. 'I took the trouble to investigate the sale of that flooring. The farmer told me what he paid the contractor when I called at his home last week. Then I got estimates on the laying and finishing from a reliable carpenter and painter. The farmer paid something over $100 per 1000 feet for his flooring, although the grade he got was a lower grade than the flooring I offered him for $85. He seemed well pleased with the price and workmanship, so I didn't say anything to make him dissatisfied. Instead I complimented the whole job. While thinking over that transaction it occurred to me what you were driving at the day you asked me about the cost of laying hardwood flooring. And I felt like thirty cents when I realized what a stupid cuss I was to let your well-intended questions get over my head. The more I thought about that flooring deal the more I thought of the contractor who took the job, and the less I thought of myself as a salesman. That contractor proved himself to be a better salesman than I am. But from now on I am going to use a different plan.'

"Now, I think that flooring incident has a good moral, and the moral is: Lumber yards should have salesmanagers.

"And why not? Can you think of any big business concern where the selling of any commodity enters into its success is without a salesmanager? I know of but one—the retail lumber business. There may be some retail lumber companies employing a salesmanager, but I have never heard of one. And consider for a moment what a vast amount of business is done in the retail lumber line. Maybe they don't consider salesmanagers as an essential part in the sale of their goods. They evidently do not look upon them with much favor. Their strongest competitors—the mail order houses—employ high salaried and brilliant salesmanagers, and they earn their money or their services would have been dispensed with long ago. Instead they are paying higher salaries than ever and combing the earth for the best talent. But this known fact seems to have failed to convince the retail lumbermen that a smart and active salesmanager is a pretty good thing to have around. That is one big reason why so many mail order houses are springing up over night and why the big ones are getting bigger. All the lumber mills and wholesalers who have broken into the big game and are staying there are keeping a salesmanager on the payroll. That is partly how they broke in and why they are staying.

"In the game of selling what sort of a showing could you expect the average untrained country yard manager to make against a brilliantly trained and wide awake salesmanager who makes the business of salesmanship his one big specialty? No one would hardly expect a pink-skinned and soft-muscled bank clerk to stay many rounds in a prize fight against a trained athlete who makes prize fighting his business. Neither would a clumsy plow horse be expected to draw down first money in a race against another horse systematically trained and conditioned to run. Then in this age of shrewd competition and bright salesmanagers what can rightfully be expected of the average yard manager who has had but little, if any, training in salesmanship and who is without the valuable assistance of a clever salesmanager? I care not how intelligent a yard manager may be otherwise, unless he has had some special training in salesmanship or is directed by a live salesmanager

"The dealer did not have the slightest idea of how to sell the farmer, who went away thinking him a highway robber."

"The dealer had evidently thought over what I said, for the next time I came in he greeted me with an appreciative reference to my hint."

he is handicapped just that much in the great game of selling.

"Take that manager who lost the sale of the flooring, for instance. That fellow is reasonably intelligent and is easily the equal of the average yard manager. But he is sadly deficient in a lot of the rudiments of selling. He lacks that ease and warmth and cleverness and confidence so quickly noticeable in a good salesman.

Had that manager been coached a little he would have sold the flooring to his farmer prospect without the least trouble and in quick time. The farmer doubtless never once realized what a small amount of flooring it required for his kitchen, and the manager never did inform him. The price of $85 hung over the farmer like a nightmare and the manager made no apparent effort to dispel the hideous specter. He persisted in referring to the price. He might as well have hit his prospect in the face with a brick as to have greeted him with the $85 quotation. The loss of that sale was likely one of many the manager has lost which might not have been the case if he had received a little coaching in the art of selling.

"Look at the life insurance companies—one of the largest and most successful organizations in the country. Their salesmen are drilled from A to Z in the knack of selling. Most, if not all, of the companies maintain schools of salesmanship. It's an intellectual and business treat to attend one of the weekly meetings of the salesmen where papers are read, discussions are had and instructions are given to the minutest detail. And the meetings fairly teem with pep and ginger and enthusiasm. Their business is done with all sorts of people—rich, poor, white, black, the illiterate and educated, all nationalities and what not. Life insurance is considered a hard thing to sell. Folks dodge a life insurance agent like a plague. Most all the stupendous amount of life insurance now being carried was sold by solicitation. So it must have required some pretty good salesmen to have sold it.

"Any one having any doubt as to the efficacy of salesmanagers or salesmanship training just let him get out in this cold and sordid world and sell some commodity in competition with a salesman who has been schooled and drilled in all the finesse and craft of efficient salesmanship. I'll put my money on the trained salesman. The fellow who beats him is the exception. No matter how proficient in any line we may become we can always improve by the process of interchange of ideas. No one fellow or firm has all the best selling ideas or plans cornered. New ideas are being devised and tried out every day by selling geniuses, and these are copied or improved upon by others in a battle of wits.

"Most retail lumbermen I know are very much concerned in getting along amicably with their local competitors, and so long as local competition is harmonious and each yard gets its proportionate share of the business they seem contented to drift along as they are. But many a dollar is being sent out of their town to some crafty mail order house which likely would have been spent at home had a trained and live salesman been on the job.

"I have been selling goods to the retail lumber yards for several years, yet I admit that I don't know much about the inside of their business. But from my experience with them and from what I have observed as an outsider, if I were operating a chain of live yards I most certainly would have a live salesmanager on the payroll. And I wouldn't employ him merely on the strength of any long list of perfectly lovely recommendations he might be able to furnish testifying to his splendid knowledge of the lumber business, or his long service as a retail lumberman. I wouldn't want a man who had been doing business in the old way so long—one of those fellows who works in one narrow groove and acts and thinks mechanically. I would put a man at the head of my selling force who had made salesmanship his specialty; a fellow who thinks and has plenty of vim and originality.

"Selling is a big factor in the retail lumber business, the same as in any other line of business, and I would give my selling force the opportunity to improve their knowledge in that important part of the business. My competitors would be welcome to use any selling plan I adopted. I would want him to do business as successfully and satisfactorily as I did. A jealous and dissatisfied competitor is a bad thing in any community. I would want my competitors to help give the lumber business more publicity; to help create more demands for our merchandise; to join me in giving the trade better service—a service that would give my town and county less justification for supporting the mail order houses.

"Just so long as retail lumbermen and other merchants remain in the old rut and refuse or fail to adopt more advanced methods of selling their wares their more progressive competitors are going to have an easier time to get along until the day of reckoning—when the unprogressive and unheeding merchant discovereth that his trade hath forsaken him and his profits hath correspondingly dwindled. Then much sorrow and regret shall encompass him."

Some Annoying Practices of the Retail Trade

A Clever Talk Which Shows How Some of the Every-Day Annoyances of the Retail Dealer Can Be Avoided

By L. E. Davidson

In recent issues we have considered some annoying practices in the lumber trade with special relation as between the mill and the retailer. It might not be out of place to consider some of the annoying practices which the retailer encounters as between himself and his customers, and to see if they may be amended or altogether prevented.

For instance, nearly all the dealers outside of the larger cities permit their customers to return unused lumber—we used the term unused relatively to distinguish it from lumber which is sold outright and becomes a part of the structure which is in course of erection.

This custom has arisen largely out of the fact that the majority of carpenters do not figure their exact wants. For instance, they have a room to floor and instead of figuring the square area exact simply make a guess, always making it large enough, and order it. The lumber is delivered. Under these conditions there is more or less sorting, and in the lower grades this hurts, because the board which is just "down on the line" in the pile as a whole becomes, by itself, the next lower grade, which entails a loss of course. And particularly so if the lumber has lain out in the sun awhile, or has been caught in a shower, or has been thrown about in a dwelling which has been freshly plastered as is often the case.

Scaffolding lumber, especially for shingling purposes, always comes back gashed here and there with nails, and often more or less warped. The loss may not be much in the individual case, but

in the aggregate there is quite an accumulation of this class of lumber. Naturally it goes back on the top of the pile and the buyer, who often takes a look at the lumber he is purchasing, sees this class of lumber, which is not a fair sample. This practice of piling such returned lumber back on its original piles should be stopped, because it does harm, and the returned lumber put in a separate place, or what is better, if the dealer thinks he can enforce it, refuse to receive any returned lumber except at a discount. There are a few districts where the dealers have made a rule to discount all returned lumber 10 per cent. The rule has had a most salutary effect. They inform me they receive back but very little lumber. In many instances the purchaser keeps it rather than lose the 10 per cent, and this is especially true with the contractors who handle much lumber. The carpenter will also take more care to figure the correct amount needed, because he knows he will be blamed by his employer for ordering more than he needs.

* * *

Another annoying practice is the borrowed lumber practice, which occurs where some public committee desires to build temporary seats to accommodate an audience. At first it would appear that the dealer could refuse to loan the 2 x 10s and 2 x 12s, which are used upon such occasions because the lumber must lie exposed to the elements three or four days, because it takes at least that long to take it there, assemble it, and return it, etc. But that is not always so easily done, especially when a committee of "dear sisters" of the X. Y. Z. Society for the prevention of cruelty to birds, or some lodge, or Fourth of July committee, or, what is worse, some camp meeting or Chautauqua crowd, who are always in a state of bankruptcy, comes bounding in, feeling sure the dealer is or should be as emotional upon the "great cause" as they. If the request is refused of course the only conclusion is that the dealer is a horned toad, or something else equally as horrid. Of course his refusal creates an interesting topic at the dinner table and all sorts of maledictions are heaped upon the head of the selfish, miserly lumber dealer. Dealers should make a charge for service of this class of 50 cents per hundred. This will effectually stop much of this class of borrowing. We know of several dealers who follow this rule and find it satisfactory.

Again, no piece of lumber shorter than 10 ft. should be taken back. Perhaps that rule is already fairly well established.

There is yet a loss no doubt, but the dealer must be enterprising enough to consider something of service. He should incidentally figure in this loss at the first of the year when he is making up the percentages of profit he should charge. Yards which keep an accurate account of unused lumber find that 5 per cent of all credit sales are returned. It is generally depreciated one-fourth.

I believe the reader will pardon me if I give what to me, as a writer for lumber dealers, is the most annoying situation I have. Some time back I commenced a sort of a campaign of education to inform the dealers it would be to their great financial advantage if they would have a note drawn up by some good lawyer of their state who thoroughly understands the mechanic's lien law of their state, which would permit them to take a note for balances due them at the completion of the job, take the note to the bank, be credited with its face, and let the bank collect the note and take the interest for their trouble. Nearly every Illinois dealer has for years had such a form of note. By it, it enables the dealer to use his capital in buying stock and keeping what the public wants instead of buying by dribs because they have so much money owing them they cannot afford to buy more until what is out is collected. Individual yard owners, some of them to-day, are not ordering stock for fall business because lumber is high in price and they have not the funds in hand to buy more, but would have if they would reduce their accounts to promises to pay in the form of notes. In the lumber business the common law rule is that the giving of a plain note waives the lien, but that if the note provides that the giving of the note does not waive the lien, then the giving of the note does not waive the lien. Just a line or so printed in the note would fix the whole matter. However, all states differ in some minor detail. No general note can be drawn which would fill the requirements of the whole 48 states, but each of those states can have such a note.

At the outset I concluded the dealers when informed of these facts would at once adopt the plan. They adopt many other good things which are not to be compared in dollars and cents to this. Yet there are now very few states whose lumber associations have attended to this matter. The States of Illinois, Indiana and Missouri now have such notes drawn for them. We know of no others. And so, my campaign of education has not succeeded and to me it is annoying, as stated. But I am not going to quit. Some of these bright days as lumber climbs higher and higher in price, and as the dealers' customers continue on in their own way to take all the time they want to settle accounts, the dealers will get tired of always being in a state of semi-bankruptcy and will adopt this splendid scheme. And especially will they have to do something of this sort when the trade acceptance as between mill and dealer goes into effect, which it will. The owners of the mills are too good business men to permit their unsettled accounts to hang long. They are either going to collect them or have a note of some sort, be it either by the trade acceptance route or otherwise. The annoying practice to the dealer of course is that the customer will take his time; he knows the dealer, and of course the dealer knows "he is worth the money, and doesn't he buy his material of that dealer; he can wait awhile." And he does, too. No dealer in the great majority of districts dares establish a strictly cash system. It cannot be done. The credit system is a part of our financial system. The mills cannot adopt it in toto. But no fair minded man can refuse to give his promise to pay in some form if he asks for credit. If he does his business should be refused. From experience I know the note system can be successfully adopted, and some "sweet day" I know my dream will come true and every state association will see to it that their dealers have such a note drawn up and a copy sent them for their use.

* * *

The 'phone rang. "Yes, this is the lumber yard." "Well, send me up about 500 ft. of 12-in. boards." "What grade?" "Oh, I do not want anything very good; something cheap; something just fair—just so it hasn't any knots in it." Sounds silly, does it, and yet similar conversations occur quite frequently in every retail lumber yard. If they would go out into the woods and take a look at the trees they might reach the conclusion that trees do not grow all "B and better," yet many buyers appear to think so. The demand for first-class lumber, or clear lumber, at the price of the common grades, is not only made by the inexperienced carpenter but by all classes. Even the government is making its demands for the choice cuts, leaving the side cuts and slashes for the public. Just at present no complaint is being made, of course, but from the humblest to the most potential citizen comes the request, in one form or another, to send cheap lumber, "just so it hasn't any knots in it." Which only goes to show the ignorance of the public as to the nature of lumber. The public, of course, is not presumed to know all the fine points of grading, but should at least know the difference between clears and commons.

The dealer encompasses this annoyance by asking for what purpose the lumber is intended and then sends the grade he knows is best suited for the purpose. The result is nearly always satisfactory. In fact, a great proportion of up-to-date dealers can and do quickly figure the material which is required for all sorts of structures. They find it pays, gets the building started and well on its way before the owner would have time to find some one else who would or could figure up the bill.

This lack of understanding of trees and lumber is not, as already stated, confined to any one class. It will be recalled how Mr. Ferris, a very noted designer or architect, specified material for ships which could scarcely be produced by the mill, and again how one Dougherty, who did understand grades and the possibilities of the mills, specified material for ships which could be made from the mills' common product, and with it built a larger ship with less material than could be produced under the Ferris specifications.

AS SEEN BY THE MAN ON THE ROOF

OUR SLIPPERY STYLES

The jury was taken to the millionaire's mansion, the scene of the murder. They were shown the drawing room with its waxed floors, the library with its loose rugs, the marble staircase and the tile bathroom.

The jury then retired and brought in a verdict that the deceased was not murdered at all, but came to his death by breaking his neck.

A REGULAR HABIT OF HIS

The carpenter and his wife were reading a letter from their son in the artillery "over there."

"Just before our boys started over the top," read father, "I laid down a barrage."

"Yes," interrupted mother, "and now he won't be able to find it when he wants it again."

THE COZY 4-ROOM FLAT

You hear a good deal in large cities and on small incomes about the "cozy four-room flat." Now, "cozy" is a grand little word, and looks well in an ad, and conjures up visions of tiny tea-cups and toe-touching tête-à-têtes. It appeals to a woman's dollhouse instincts and matches up well with a man's bank account. But——

The rooms in some cozy four-room flats are too small altogether, and especially too small separately. We remember we lived in one once that stood on a 30-ft. lot, and life therein was just one grand choking sensation. The only way to enjoy one of those rooms was to sit on the window sill like a window washer and look in. We had to give it up finally when we bought the percolator and couldn't get anything smaller than a five-cup size.

An apartment house should have large, airy rooms like they have in the country and in advertisements. Some of them are just about as light and airy as Chopin's Funeral March. They often open on a court and end in a divorce one. There are times when even the most loving couple should be more than 6 ft. apart. A bride is likely to weary of a husband when she never gets out of sound of the ticking of his watch.

Advertising is wonderful anyway, isn't it? The young couple always falls for the "four *cozy* rooms" stuff, but if the landlord advertised "four *small* rooms" he would never get a tenant. Now, a moderate amount of coziness is all right; but you will notice that the dove, the national bird of all lovers, lives in a cote and not on a nest.

Like everything else, the cozy four-room flat can be carried to extremes. There are times when it won't do. It is a poor place to practice the cornet or to take singing lessons. To every soul there come moments when one longs to soar away to some distant realm of heavenly azure, and one of them is when your wife is trying to make E, or your husband is corneting in your little flat and the cornet is a little flat itself.

The agent will tell you how "intimate" these cozy four-room flats are. Intimate is right. There is nothing in the world quite as intimate as corned beef and cabbage cooking in a kitchenette. It just makes itself at home all over the house. That is one thing we do not like about corned beef and cabbage. It has so little privacy about it. One may be able to conceal a murder, but never corned beef and cabbage.

So we are not wildly enthusiastic over, even moderately delighted by, the cozy four-room flat if it is too cozy. It makes us long too much for a life on the ocean wave or in the middle of an untenanted prairie. It makes us want to stretch our arms and yell, and it has the same effect on the baby; and the baby isn't as good at restraining its emotions as we are.

Honestly, we think we could be more content with seven large rooms, even if they weren't quite so blamed cozy.

NOTHING QUITE AS GOOD

The Irish soldier was home on furlough and proudly exhibiting to the family and neighbors his arms—his gun and bayonet and ammunition, and all the accouterment appertaining thereto. All were enthusiastic except the old father, who, though he approved, was mild in his praise.

"And isn't it a fine layout it is?" asked the son.

"Yis," replied the old man, "but wasn't there toimes whin you longed for a brick?"

AS PROMISED

"That builder said he would build us a cracking good six-room stucco house for eighteen hundred dollars."

"Well, did he?"

"Yes, it's cracking good already."

IN THE SWING A YOUNG MAN'S FANCY

"Jones says that porch swing of his has paid for itself already."

"A porch swing is a great comfort."

"It isn't that—but he has married off two daughters this summer."

GASSED

Neighbor—Does your wife like cooking with gas?

Henpeck—Yes; what she doesn't like is me gassing with cook.

IT ALWAYS WORKS

The second assistant teller was under suspicion of knowing who, or whom, it was that rifled a certain vault on a certain night, but it was desirable not to let him know he was under suspicion until the suspicion had, or had not, been confirmed. Certain telltale finger marks had been discovered in the dust of the vault door, and now the finger print of the second assistant teller was desired for comparison. But how was this to be obtained without his knowledge? Ah, yes, indeed, how? They sent for the Great Detective.

The Great Detective smiled and went away. That afternoon a painter painted white a door casing a few feet from the second assistant teller's cage and put up a "do not touch" sign. That night the second assistant teller was in the toils. He was the guilty man, and the Great Detective had the fingerprints to prove it.

DESCRIPTION BAFFLED AGAIN

"I don't suppose there are words to describe your new bungalow."

"Yes, there are words—but my wife won't let me use them."

HE COULDN'T BUILD IT FOR THAT NOW

Pastor—Three thousand years ago Solomon built the temple.

Owner—That is where he showed he was wise.

SAFETY FIRST

"Father, what is meant by the German royal line?"

"It's about twenty miles back of the firing line."

SUBURBAN LIFE

"Do you think the world will ever be made safe for democracy?"

"Yes, except possibly for pedestrians."

EVEN MORE

Neighbor—Did your new house cost more than you thought it would?

Builder—Worse than that; it cost more than I thought it wouldn't.

SOME WIVES OBJECT TO THE JOB

"Do you have much trouble with your furnace?"

"No, but I have considerable with my wife."

INFANT INDICATIONS

Fond Ma—Our baby boy keeps saying "Extra! Extra!" in his sleep. I hate to think of him growing up and being nothing but a newsboy.

Fond Pa—Never mind, dear. He isn't going to be a newsboy. He's going to be a building contractor.

AND TO HANG HIS CLOTHES

Neighbor—Why do you build a garage if you haven't a car?

Subbubs—Well, my wife has a lot of relatives, and a man has to have somewhere to sleep.

New Equipment That Will Interest Builders

A new type of concrete mixer known as the Little Whirlwind Concrete Mixer, which is shown in Fig. 1, is being put out by The Little Whirlwind Mixer Co., 438 Gould Street, La Crosse, Wis. The chief advantage of this mixer is that one man can run it by hand power, but if other power is desired it is a simple matter to connect it up to a gas engine. However, a 1 hp. engine is all that is required if one uses electric power. The view illustrated shows the chute in a discharging position. The drive pinion is made of semi-steel. The frame is constructed of angle iron, strongly braced, and is light, strong and durable. The mixer's style is on the batch mixer bucket discharge order and has a capacity of between 2 and 3 cu. ft. of mixed material. The drum measurements are 25¾ x 32 in. and the entire mixer weighs about 360 lbs.

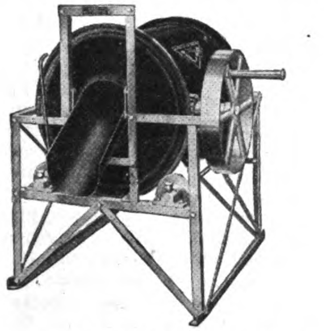


Fig. 1.—The Little Whirlwind Concrete Mixer.

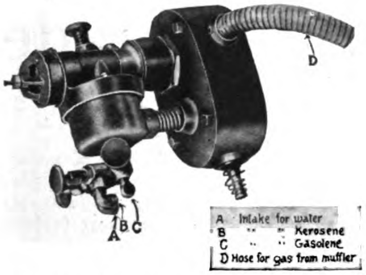


Fig. 2—Twin Service Carbureter Used on the New Concrete Mixer Manufactured by the Northwestern Steel & Iron Works.

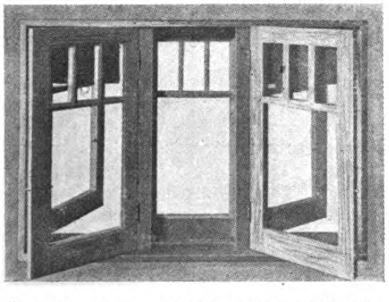


Fig. 4.—A Convertible Comfort Porch.

The item illustrated in Fig. 2 is the Twin Service carburetor with which the Northwestern Steel & Iron Works, Eau Claire, Wis., are equipping the engine used on their 1918 concrete mixer. This device permits the operator to use either gasolene or kerosene in the engine, as desired. It is stated that this carburetor will effect a reduction in mixer fuel costs of one-third to one-half. The illustration shows two lead pipes from the storage tank, each with a shut-off valve, enabling the operator to draw either fuel as wished. By means of a superheating attachment, which introduces gas from the muffler of the engine, the kerosene is volatilized to the proper point for producing the maximum explosive power within the cylinder.

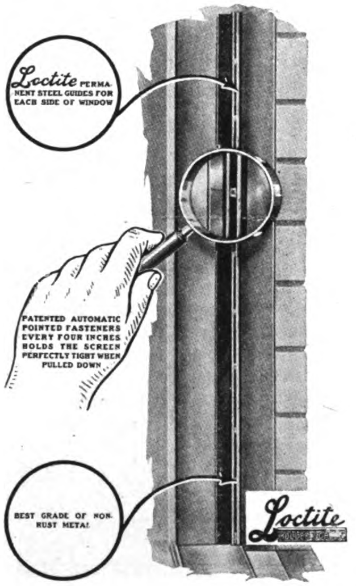


Fig. 3.—The Loctite Roller Screen.

The Loctite roller screw illustrated in Fig. 3 is a new product recently put out by the Motors Appliance Co., East Moline, Ill. The roller screen will cover the whole window and is said to be the only roller screen with automatic locking strips at the sides. These locking strips are clearly illustrated in Fig. 3. The screen is especially suited to casement windows and is easy to operate. For new buildings the screen is placed inside the casing at the top. There is a strip sufficiently long attached to the roller to admit pulling the screen all the way out and fastening on new screen should this be necessary at any time. An advantage of this screen is that it fits either inside or outside casing and adds to the convenience of the housewife.

A convertible comfort porch being put out by the Weisse Mfg. Co., La Crosse, Wis., is shown in Fig. 4. The illustration shows the method of hanging shown from the inside. On the left the screen is outside and the sash is inside. On the extreme right the sash is shown outside and the screen inside. In the center is shown the stationary center sash. The convertible feature of the Comfort Porch is secured as follows: Each section frame has a stationary center sash fastened onto the outside of two small posts. To it, on one side, is hinged another sash

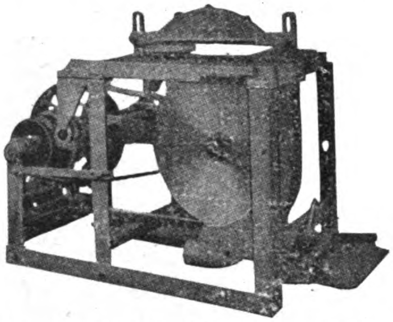


Fig. 5.—The New Challoner Cut-Off Saw Table.

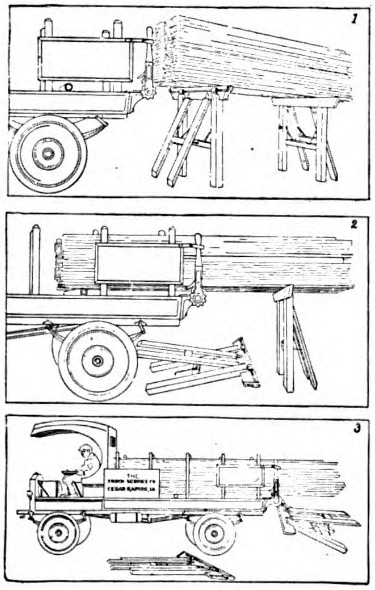


Fig. 6.—A Quick Roll System of Loading Trucks.

to swing. On the opposite side, inside, another sash is hinged onto one of the small posts. When the sash are closed a stormproof porch is formed. On the opposite sides of the hinged sash screens are hinged so that by folding the two hinged sash over the stationary center sash two-thirds screening remains or a screened-in porch. Between the screens and sash there is a space in which shades are fastened.

The New Challoner Cut-off Saw Table illustrated in Fig. 5 is being manufactured by the Hartmann-Greiling Co., Green Bay, Wis. It has many new features and advantages. A 24-in. saw is used and is designed for general factory use. The table is of cast-iron plained true on top. The frame is of angle steel, making a very strong machine. The arbor is in a frame hung at the rear of the machine; you can always align the saw to the work simply by turning a set-screw. The saw drops below the table and gives the operator both hands to handle the work. The saw is said to be always in the right position, so there is no lost motion. By the movement of 1½ in. on the pedal a 12-in. board is cut. The new machine requires a floor space of only 2 ft. by 4 ft. 10 in.

A time-saving, labor-saving quick loading process of especial use to lumber dealers has recently been brought out by the Truck Service Co., Cedar Rapids, Iowa. In Fig. 6 the quick roll system is shown in action. While the truck was out the load was put on the quick loaders. The roller in the front leg permits the truck to roll it out, easing load on to the roller of the quick roll body. And when the truck goes forward the rear leg eases the full weight on to the quick roll body. The quick loader has a capacity of from one to seven tons. The roller is fitted to rugged bearings and the loader is equipped with wide steel braces and held together by strong bolts.

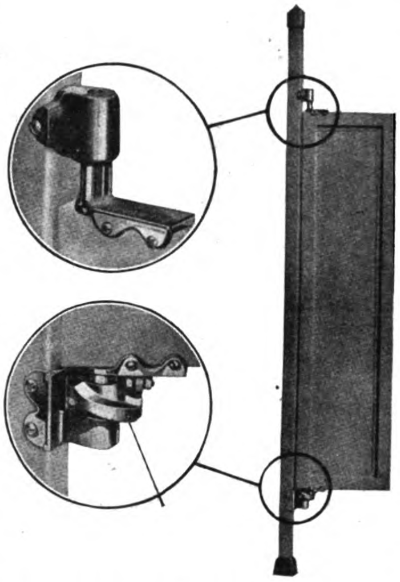


Fig. 7.—Hinge for Swing Doors.

A hinge for swing doors known as Carpenter's Gravity Roller Hinge has been added to the products of the R. F. Carpenter Mfg. Co., Boston, Mass. Fig. 7 shows an installation of Carpenter's gravity hinges on a sanymetal steel toilet door with close-up view of hinges. The use of a spring for the closing force is wholly dispensed with. The door closes from its own weight by the force of gravity. The roller at the bottom does the business. By this roller friction is largely eliminated. This hinge consists of five parts only. The upper hinge is essentially a heavy casting with a pivot carried in a socket. The lower hinge is of similar design, with the weigth of the door carried on a wheel rolling on a double incline. The reversible cam in the lower hinge embodies a socket for the pivot and also an incline for the roller.

New Catalogs of Interest to the Trade

Spencer Super-Standard Heaters. Spencer Heater Co., Scranton, Pa. Catalog No. 16. Sets forth the heating qualities of the super-standard. Describes in detail the kind of heaters manufactured by this company. Also contains numerous testimonials of users.

Scientific Industrial Illumination. Holophane Glass Company, 340 Madison Avenue, New York. Illustrated booklet, takes up fully the economic advantages of scientific illumination. Devotes considerable space to good industrial lighting and the company's progress in this direction. Contains interesting general engineering data of reference value.

Fenestra Solid Steel Windows. Detroit Steel Products Company, Detroit, Mich. Booklet devoted to monitor sashes and operators. Profusely illustrated and describes fully advantages of the "Fenestra" service.

Coburn No-Trac Hangers. Coburn Trolley Track Mfg. Company, Holyoke, Mass. Describes fully the principle and workings of the No-Trac hangers which enable sliding doors to be operated without the use of track and trolleys.

Non-Staining Mortar for Pointing, Setting and Backing. Atlas Portland Cement Co., 30 Church Street, New York. Booklet is an elaborate issue containing photographs illustrating buildings in which "Atlas White" has been used. Tables of strengthened physical and chemical properties of "Atlas White" cement are given.

Burrowes Rustless Screens. E. T. Burrowes Company, Portland, Me. Illustrates the evolution of the Burrowes screen from its birth to its present standard. Screens for porches, verandas, etc., are illustrated.

Farmers' Paint Book. Harrisons, Inc., Philadelphia, Pa. A veritable catechism of paints covering every field of painting from silos to the parlor. A useful book on paints and painting.

The Reed Non-Corrosive Trap Chamber Cover. Murdock Damper & Bronze Company, 127 Federal Street, Boston, Mass. Describes a trap chamber cover which is easily removable, inconspicuous and non-corrosive.

"Buckeye" Conduit from Ore to Finished Product. Youngstown Sheet & Tube Company, Youngstown, Ohio. Booklet describing Buckeye conduit and illustrating some buildings in which it has been installed.

The Statesman. Charles H. Brown Paint Company, Brooklyn, N. Y. House organ. Contains news of special interest to dealers.

Metal Lockers. Manufacturing Equipment & Engineering Co., Boston, Mass. Booklet devoted to the subject of metal lockers.

Rubber Necessities for the Modern Building. W. H. Salisbury & Company, 105 South Wabash Avenue, Chicago, Ill. Attractive booklet illustrating "Flexible Tile Flooring," "Fire Protection Equipment" and "Mats and Matting Accessories," etc.

Sanitary Bubbling Fountain. Manufacturing Equipment & Engineering Co., Boston, Mass. Describes and illustrates ice-cooled water supply for shop, factory office and general use.

Fireproof Doors and Windows. A. C. Chesley Company, Inc., New York City. Describes Kalamein stock doors.

Front Rank Furnaces. Haynes-Langenberg Mfg. Company, St. Louis, Mo. Booklet describing various types and sizes of furnaces. Contains directions for setting them and other useful information.

Builders' Hardware. National Manufacturing Co., Sterling, Ill. Catalog contains photographs and descriptions of this firm's products.

Sanitary Washbowls. Manufacturing Equipment & Engineering Co., Boston, Mass. Describes sanitary washbowls in homes and industrial establishments.

The Old Fashioned Open Fireplace. Chattanooga Roofing & Mfg. Company, Chattanooga, Tenn. Contains instructions on how to build an old fashioned open fireplace. Describes and illustrates "Cahill" products.

Service Sheets. Architectural Service Corporation, 140 North Sixth Street, Philadelphia, Pa. Describes these sheets, which are scale drawings showing in detail how various materials are used, such as wire and wood lath, insulation, dumbwaiters, concrete porches, skylights, etc.

The Season is NOW!

The time is ripe for big business in the garage line.

Manufacturers are prosperous. Farmers are making more money than ever and the automobile is a necessity to both. Every machine must have a home.

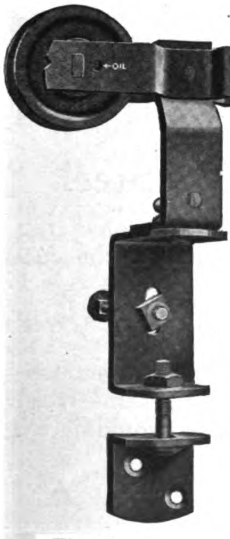
Sales for National Garage Hardware

are awaiting around the corner.

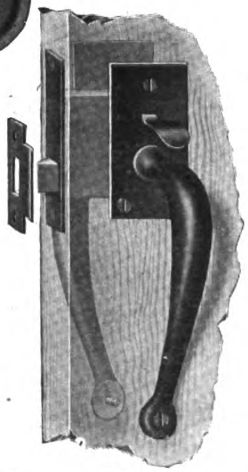
Your customers will thank you for telling them how to equip their garages with these doors.

Here is some National Garage Hardware that will satisfy your customers.

Sixteen years' experience enables us to produce goods of highest merit.



The Hanger operates on a swivel and turns on the track without sticking or binding in any way



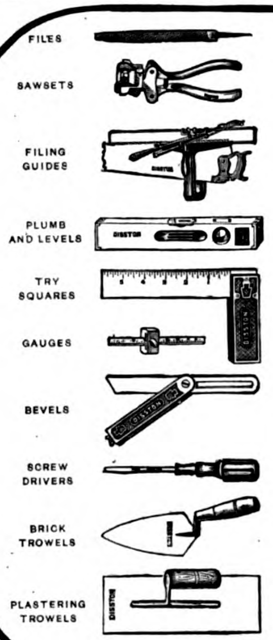
The No. 27 Latch has no complicated parts to get out of order

You will find the designs pleasing and practicable—the prices right.

Send for 1918 catalog and give dealer's name.

EQUIP the garages you build this summer with National Fittings. Doors equipped with National Products are sure to give your customers satisfaction at all times.

NATIONAL MANUFACTURING COMPANY
Sterling Illinois



The

SAW or TOOL

with "DISSTON" on it

is Guaranteed

SUPERIOR in QUALITY and FINISH

to any saw or tool

without "DISSTON" on it.

"If you want a Saw or Tool it is best to get one with a name on it which has a reputation. A man who has made a reputation for his goods knows its value, as well as its cost, and will maintain it."

1840

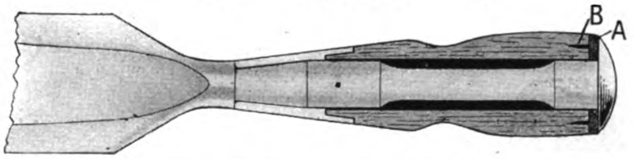
Henry Disston

Fac simile of label used on all DISSTON Saws.

HENRY DISSTON & SONS, INC.

Keystone Saw, Tool, Steel and File Works
PHILADELPHIA, U. S. A.

Stanley Tools



STANLEY "EVERLASTING" CHISELS

Blade, Shank and Head One Piece of Solid Steel

This not only insures great strength and durability but enables the full power of the blow struck by a hammer or mallet to be transferred directly from the head to the cutting edge.

The Blade is forged from one end of the steel rod, the other end being upset to form the Head.

A leather washer (A) is placed between the head and the handle. This acts as a cushion, relieving the handle from shock when a blow is struck, thus preventing same from splitting. A Brass Ring (B) is driven into the large end of the handle, providing an additional safeguard.

The illustration shows the general construction of all "Everlasting" Chisels.

Special circular upon request.

STANLEY RULE & LEVEL CO.
NEW BRITAIN, CONN. U.S.A.

Everything in Locks and Builders' hardware that you will require to equip any structure from a cottage to a skyscraper.

"Hints to Home Builders" sent on request.

P. & F. CORBIN

The American Hardware Corporation, Successor

NEW BRITAIN, CONN.
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The Home of Corbin Quality ~ The largest factory in the world devoted exclusively to the manufacture of builders hardware.

WHY?

Tool Steel Edge?

Because there is where you want the quality. That is why our adze wears longer. Cheap adze are solid steel and they cannot afford to use the best quality steel.

Get the Best.

Write for Catalogue.

The L. & I. J. WHITE CO.
100 PERRY ST. BUFFALO, N. Y.

ORIGINATORS
OF
SASH CHAIN

The Standard for over 35 Years Capacity of chain plant 35 miles per day. Many imitators, no equal. Used by the United States Government for over 30 Years.

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COPPER CABLE SASH CHAIN

Thomas Morton

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COPPER CABLE
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CHAMPION METAL
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SASH CHAINS

CHAINS

For Suspending Heavy Doors
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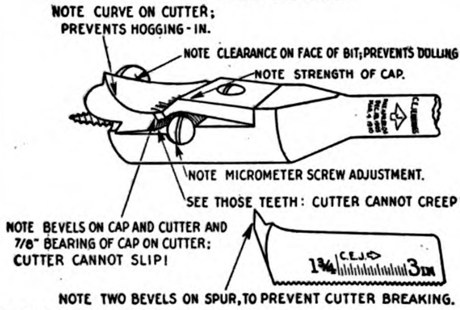
All of SUPERIOR QUALITY

CHAMPION METAL SASH CHAIN

C. E. Jennings ARROW HEAD **Expansive Bit**
STEERS PATENT



C. E. JENNINGS & CO., *Sole Manufacturers,* **71-73 Murray St., N. Y.**

Something For You

in our Pamphlet 29; viz.:

Valuable Tables for finding size of joist, safe load of joist, actual load on hanger, etc., etc.

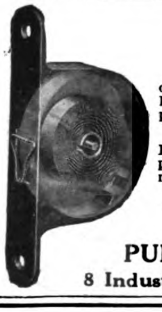
Some of these Tables are not in print elsewhere.

The Pamphlet and the Mounted Model Hanger will be mailed on request.

SOMETHING FOR US. We ask your special attention to items 5, 6, 7 on page 5 of the Pamphlet and to the matter on pages 23 and 24 relating thereto.

The W. J. Clark Co.
Salem, Ohio, U. S. A.

Pullmanize Your Window



PULLMAN
Unit Sash Balances

cost less than cords, pulleys and weights, last longer, are neater in appearance, and a carpenter can install twice as many per day.

OVER FIVE MILLION IN USE

Recommended by architects everywhere, approved by Fire Underwriters' Laboratories and may be used in fireproof buildings.

Guaranteed for ten years.

Write for illustrated catalog and blue prints
See Sweet's Index, pages 764 and 765.

PULLMAN MFG. COMPANY
8 Industrial St. Rochester, N. Y.

MACK & CO.

YOU will always feel secure when you use Barton Planes and Edge Tools. The making of keen edged tools that hold their sharpness is our hobby. If your dealer won't supply you we will.
There is some mighty interesting and profitable reading in "The Carpenter's Catalog" and "True Stories." Both free, of course.

Brown's Race & Platt St., Rochester, N.Y.

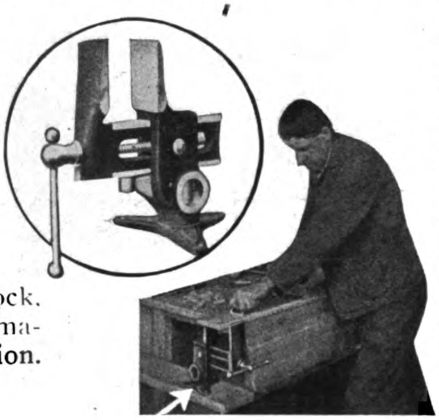
LOOK AT THIS

It's The Carpenter Vise

Ripping a Board

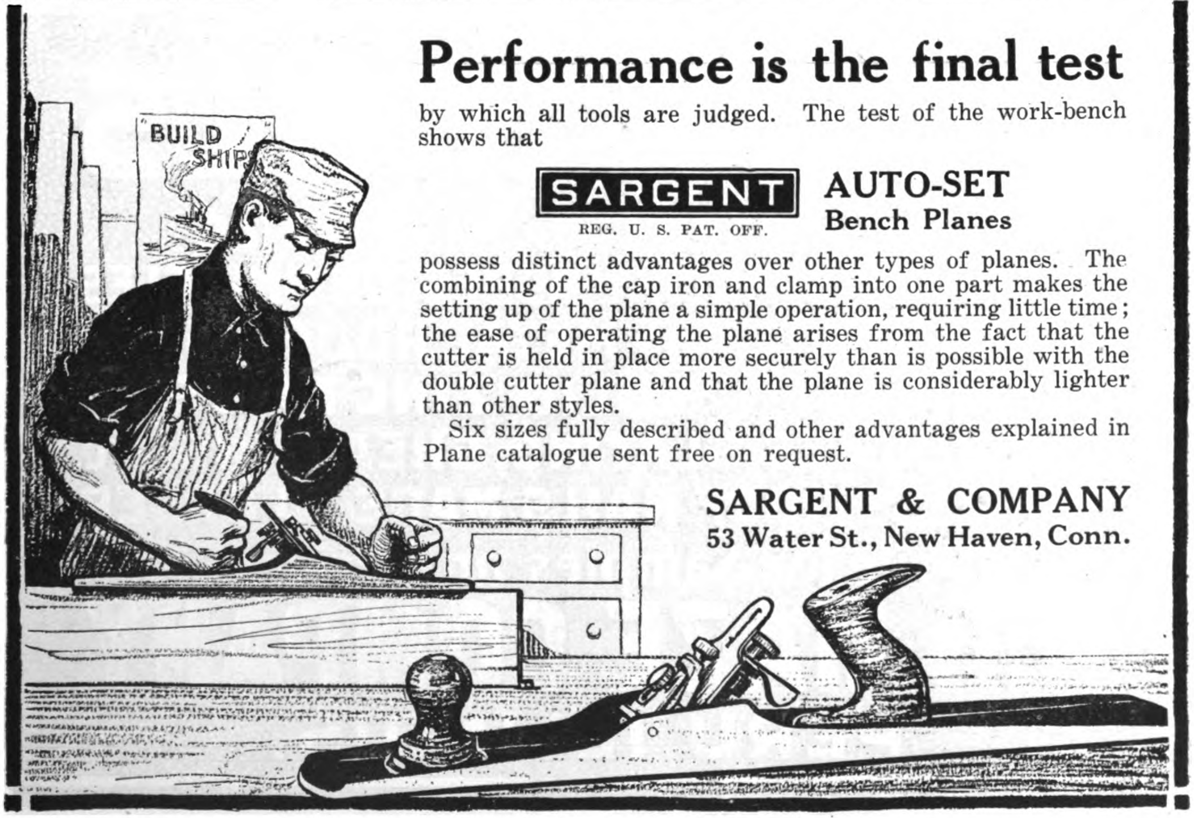
Planing a Wide Board

This is the last word in vises for the wood worker; swings free on the base; one movement grips the work and locks the vise on its base, either in horizontal or vertical position; holds the work always JUST RIGHT to make the work easier, thus increasing production with less fatigue to the worker. It is a money maker for the contractor; a time saver for the woodworker. Ask your Hardware man to show you one of these tools; it will surprise you. If he does not carry them in stock, write us for complete information and our trial proposition.



Planing, Flat on Bench

THE WILL-BURT CO.
ORRVILLE, OHIO



Performance is the final test

by which all tools are judged. The test of the work-bench shows that

SARGENT REG. U. S. PAT. OFF. **AUTO-SET Bench Planes**

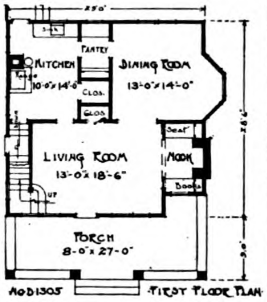
possess distinct advantages over other types of planes. The combining of the cap iron and clamp into one part makes the setting up of the plane a simple operation, requiring little time; the ease of operating the plane arises from the fact that the cutter is held in place more securely than is possible with the double cutter plane and that the plane is considerably lighter than other styles.

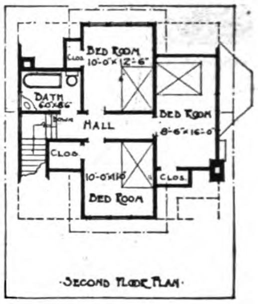
Six sizes fully described and other advantages explained in Plane catalogue sent free on request.

SARGENT & COMPANY
53 Water St., New Haven, Conn.

KEITH'S Artistic Ideas FOR THE BUILDER

Design D 1305 from "Keith's"





You can build beautiful homes like these just as easily as the ordinary kind, and if you put character into your work, the business will come to you.

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130 Plans for Bungalows
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SEND ALL ORDERS TO
M. L. KEITH, 700 McKnight Building, Minneapolis, Minnesota

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"ZINCLAD" CUT AND WIRE NAILS
FOR WOOD, ASPHALT AND ASBESTOS SHINGLES
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FOR SHINGLES, SLATING, SHEATHING, ETC.
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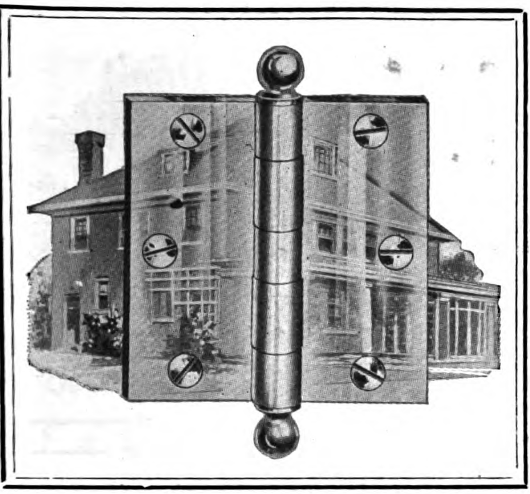

Your

ATTENTION!!

is called to the hinges on the door. To some people door hinges may seem rather small and unimportant—nevertheless, their mission in helping to make or mar the appearance of the rooms in a modern home is worthy of serious thought. The

GRIFFIN

"The Door Butt of America"

is designed along lines that insure both *beauty* to the home and *service* whenever the doors are opened and closed.

The Griffin operates freely and easily, it is amply strong for heavy doors and it is such a pleasing fixture that architects and home builders are glad to specify and use it.

Being finished in the various Griffin hardware finishes, it is in wide demand for the better class of houses and office buildings.

Send for illustrated catalog and circulars.

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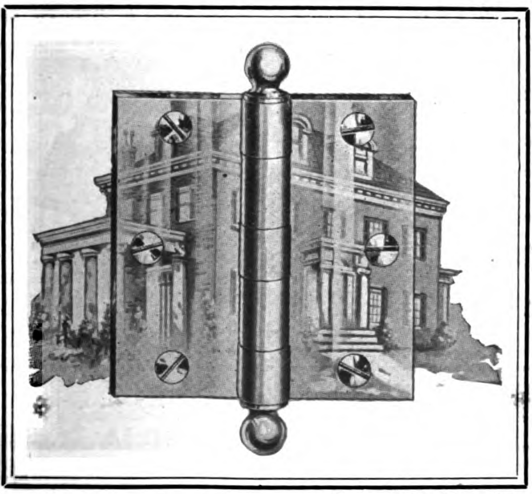

Speed with Accuracy

With munition factories working overtime, shipyards rushing ships, and other war activity calling for industrial housing and extensive building operations, the building trades have to hustle. To do this and still maintain the necessary accuracy, the carpenter or builder will find

TRADE MARK
Starrett Tools
REG. U.S. PAT. OFF.

an invaluable aid.

Whether using the combination square, divider, marker, scratch gage or any of the other Starrett Tools, the user can **know** that he is getting the utmost satisfaction and service that can be put into a tool.

Free Catalog No. 21 P on request.

The L. S. Starrett Co.
The World's Greatest Toolmakers
ATHOL, MASS.
NEW YORK LONDON CHICAGO
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"YANKEE"

Push Drill No. 44

Saves Time at Every Turn

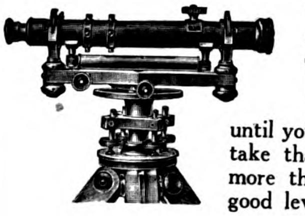
Here you have a rapid fire drill, with adjustable tension, for hard or soft woods and the 8 different size Drill Points furnished with it.

A turn of the cap does the trick that saves you time, labor, and Drill Points. This drill is about as valuable to the average mechanic as any "Yankee" Tool we make. Built for hard service.

Your Dealer Can Supply

Let us send you a YANKEE Tool Book

NORTH BROS. MFG. CO.
Lehigh Ave., Philadelphia, Pa.



Don't You Wait

until you have made a mistake that will cost much more than the price of a good level.

Get a "Kolesch" *Now*

Send for prices and full particulars

KOLESCH & CO., 138 Fulton St., New York

No. 2020

An Accurate, Compact, Durable Level—IT'S A "WHITE"

On small job and big job alike you will find the **"White" convertible level** used by hundreds of progressive contractors. Whether it be laying out a building lot or lining up foundation piers, one of these **durable, moderate priced** instruments will serve you with unvarying accuracy. You know we send these instruments to anyone who is responsible for free ten days' trial. **Let us send you one** or at least a circular with full facts.

DAVID WHITE CO., (Inc.)
421 East Water Street
MILWAUKEE, WISCONSIN

MYERS Stayon and Tubular Door Hangers and Tracks

For Sliding Doors on Barns, Garages, Sheds, Warehouses and Similar Buildings.

Twelve Styles — with Adjustable, Flexible and Stayon Features—afford the dealer or contractor a wide range of selling opportunities.

Each style, packed one set to a carton, six sets to a shipping case. Track in standard lengths, bundled or crated, for easy storage and handling. Catalog shows the line.

F. E. MYERS & BRO. - Ashland, Ohio

CALDWELL SASH BALANCES UNIFORM MORTISES

Patent Pending

They have stood the test of time

For use in all classes of new work

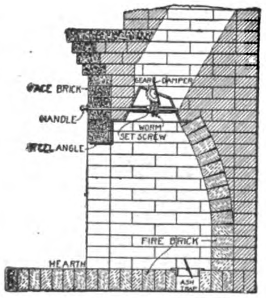
Box frames unnecessary

Mortises cut at mill reduce cost of installing. Counterbalance sashes at any given point. They outwear ordinary weights and cords. Unaffected by atmospheric conditions.

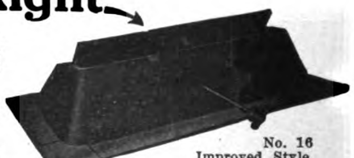
Cheapest method for modernizing old windows, as alterations in sashes and frames are not necessary. Sashes should be weighed before ordering.

Write for Circular

Caldwell Mfg. Company
5 Jones St., Rochester, N. Y.



Build the Fireplace Right



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Improved Style
Made in 7sizes

Don't try to reduce the cost by leaving out a good damper. It results in an expensive fireplace to operate and allows rain, wind, birds and other objectionable things to enter the room when the fireplace is not in use.

Stover Dampers support the brick work, form a smooth throat, regulate the draft perfectly, and reduce the labor cost of erecting fireplaces.

The price is low enough so a Stover Damper can be used in every fireplace. Made in several styles for all size openings. The improved style shown above is one of the most popular.

Send for catalog No. 1740 showing our fireplace fixtures and giving information as to the best fireplace construction.

We also make windmills, feed mills, gasoline engines, hinges, pulleys, saw vises, latches, sink brackets and other hardware.

STOVER
Mfg. & Engine Co.
Freeport, Illinois

Stover Mfg. & Engine Co., 747 East St., Freeport, Ill.
Send us Catalog 1740.

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FORSTNER
Labor-Saving
AUGER BIT

Bores Any Arc of a Circle

Many New Uses

The Forstner Augur Bit, unlike other bits, is guided by its circular rim instead of its center, consequently it will bore any arc of a circle, and can be guided in any direction regardless of grain or knots, leaving a true polished surface. Takes the place of a chisel, gouge, scroll-saw, or lathe tool combined. For core boxes, fine and delicate patterns, veneers, screen work, scalloping, fancy scroll twist columns, newels, ribbon molding and mortising.

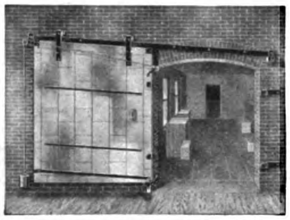
Try it and be convinced.

The PROGRESSIVE MFG. CO.
TORRINGTON, CONN.

Buildings Need Fire Door Protection

RICHARDS-WILCOX RW AURORA TRADE MARK

The doors and windows in any building create drafts which, in case of fire, would spread the flames.



Richards-Wilcox Automatic
Fire Door Hardware and Fire Doors

automatically close these openings and smother fires before they gain headway. Inspected, approved and labeled by the National Board of Fire Underwriters.

Whatever your requirements, we can furnish the necessary equipment.

Write for our fire door hardware catalog or tell us your requirements, and we will quote you on proper equipment.

Richards-Wilcox Manufacturing Co.
AURORA, ILLINOIS, U.S.A.
Richards-Wilcox Canadian Co. Ltd. London, Ont.
"A hanger for any door that slides"

SAN FRANCISCO
LOS ANGELES
NEW YORK
CHICAGO

PHILADELPHIA
MINNEAPOLIS
BOSTON
ST. LOUIS

Showing Sun-Shade Attachment

Try This Aloe Level
10 DAYS—FREE

Easy Monthly Payments If You Buy

Prove the superior quality of the Aloe Convertible Level by testing it out for 10 days. Use it on your every day work laying out buildings, locating foundation piers, leveling up foundations, walls and floors, aligning, shafting walls, piers, etc., for getting angles, or levels anywhere and the hundred and one other things for which you would use a level or transit. Then, if you decide to keep it, you may pay for it in easy monthly payments so small that you will scarcely feel them.

Aloe Convertible Level

is more than a mere level. It is a modified transit permitting double the range of work possible with an ordinary architect's level. Its construction is such that sights above or below the horizontal can be taken, making it the finest instrument ever offered at anywhere near the price. For taking vertical sights the instrument is provided with a special convertible bracket rigidly and permanently attached to the cross-bar thus eliminating the extra time that other instruments require for changing the telescope in position to take vertical readings. The telescope which is fitted with a permanent axis, rests in the bracket bearings and owing to our special constructed clips the instrument can be used for levelling while in this position if desired, although the bracket clips are easily and quickly released from the telescope axis when levels only are to be taken. The telescope is then set in its normal position in the wyes and you have overcome the old method of attaching and detaching the convertible bracket.

Your Own Time To Pay—No Interest

Remember, you are under no obligation whatever to keep the Aloe Convertible Level. We do not even ask you to promise to buy. But you owe it to yourself to see and try it. If it isn't all you expect you may return it at our expense. If you do keep it, you will find the small monthly payments easier than paying rent for an instrument—and at the end of a few months you will own it—absolutely. There's no red tape about this offer—we ask no embarrassing questions—everything is confidential—we charge no interest. You have practically your own time to pay.

Mail Coupon for Descriptive Circular

It explains the Aloe Convertible Level in detail and shows how easily the man without the training of the engineer or surveyor may secure the same accurate results as the expert. Send your name on coupon or postal for free copy and full particulars of our original, unique and popular selling plan.

A. S. ALOE CO., 625 Olive St., St. Louis, Mo.

Mail Coupon NOW

A. S. ALOE COMPANY,
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Please send free descriptive circular about the Aloe Convertible Level and complete details of your easy payment plan. This request in no way obligates me.

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"The Standard" Low Charging CONCRETE MIXER

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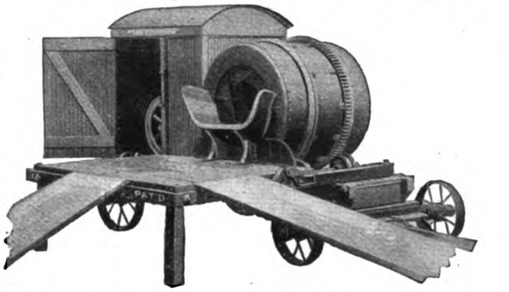

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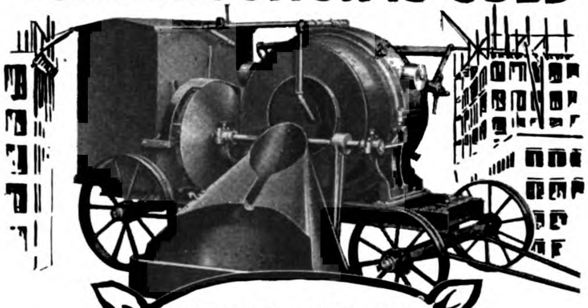

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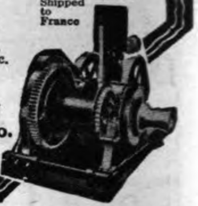

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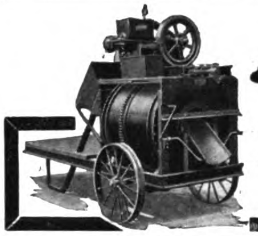

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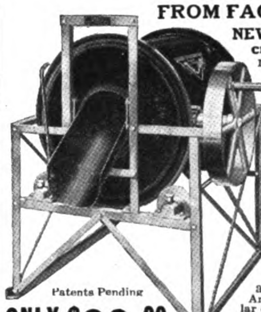

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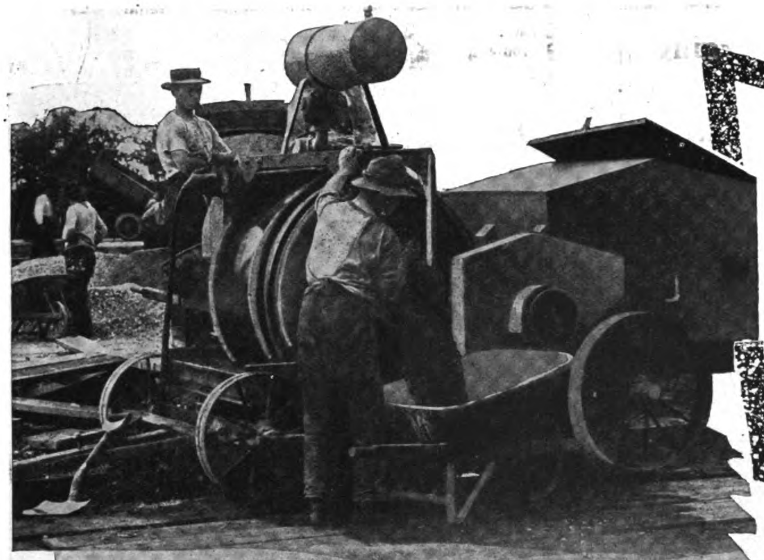

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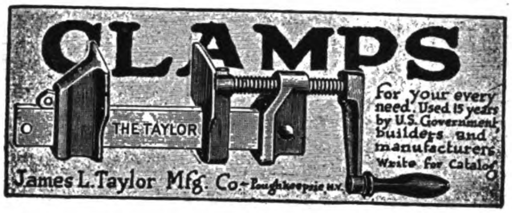

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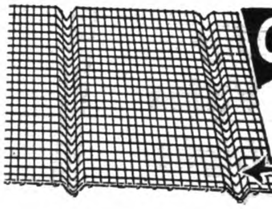

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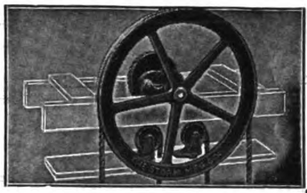

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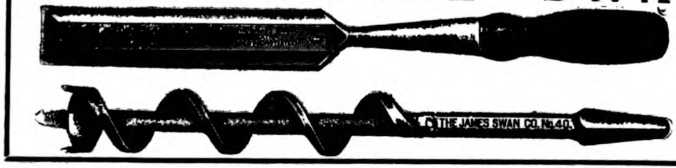

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BUILDING AGE

New York, September, 1918

A Five-Room Brick and Stucco Cottage with Interesting Floor Plan

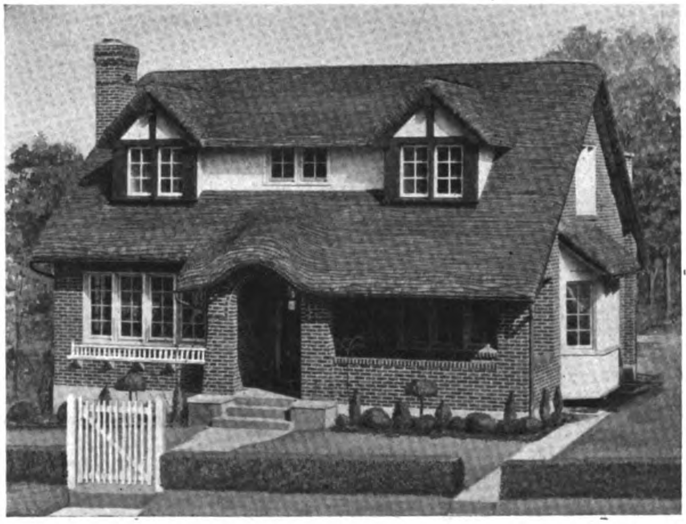
In its freedom of adaptation in style and materials this design shows its thoroughly American qualities. Various styles of architecture have been drawn upon to furnish inspiration for it. The thatched roof is usually associated with the English cottage type; the pointed dormers called to mind the English half-timber house; while the brickwork and the heavily buttressed, round-arched entrance are suggestive of Roman architecture.

Another point of interest in connection with this exterior is the skillful way that stucco has been worked into the design. The window bay in the dining room and the dormers in the second story, as well as the visible part of the foundations, are all of this material.

A glance at the plan of this house will reveal many points of interest, particularly from the standpoint of economy. In the second story, of course some space is lost because of the sloping roofs, but on the first floor not an inch is wasted. Although the space is comparatively small, everything is provided. There is an adequate front porch, bricked up to convenient railing height. The entrance door is of oak, with small lights of plate glass at the top.

Upon entering the house one finds himself in a small central hall, separated from the living room only by the beaming of the ceiling and by one column. There are double columns dividing it from the dining room. This gives the house an open living space quite out of proportion to the size of the house itself, a thing which is considered highly desirable in this age, when rooms are designed to be lived in rather than shut off and saved for weddings and funerals. Features like this are responsible for much of the attractiveness of such a house when a sale is considered.

Notice the extreme length of the living room, and the fact that the fireplace, which is of simple red brick, centers not on the end wall of the house, but on the opening from the hall. The beaming of the ceiling accentuates the living room doorway also, as well as emphasizing the close relationship between hall and living room. The bay in the dining room has the same center as the fireplace, giving a good axis to the front half of the house. In this way the cheery fire is made visible from the dining room in bad weather, while the graceful alcove in the dining room makes a pleasing vista across the hall from the living room, and affords excellent circulation of air in summer.



The front of the house is interesting because of its harmonizing variety of treatment. Louis Lott, Architect.

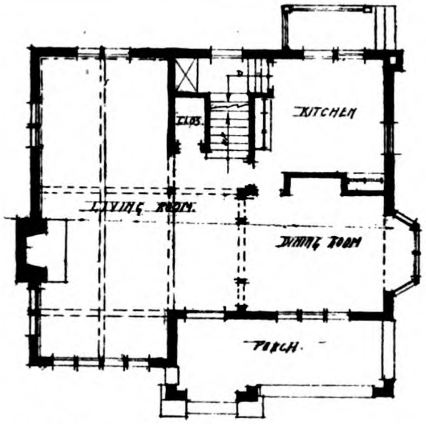
The windows in the house are all casement sash, hinged to swing in. The exterior casings and sash are painted white, while the interior finish is of dark oak. This obtains in the entire first floor, excepting only the kitchen. The stairs are of the same finish as the other first floor woodwork. The floors throughout the house are of light oak, rubbed down and waxed to a high polish.

The stairs to the second floor are at the far end of the hall. This means that one must pass the open living and dining room doorways to gain access to them—very often a desirable thing in the small house where no servants are kept. A roomy closet is at the left of this stairway, serving for coats and general utility. The stairs to the basement go down under the main stairway, and at the landing, four steps down, there is space for a refrigerator.

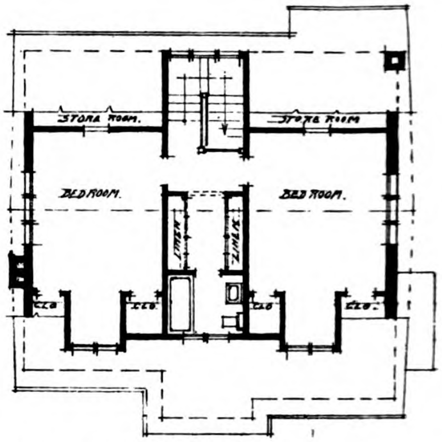
The windows in the kitchen are high enough to permit of placing furniture below them, and there are built-in dressers on two sides of the kitchen in convenient spots where they do not project into the room.

An unroofed platform of cement with a single railing about it serves as the rear porch.

The space afforded by second-floor plan, it will be noted, is very much smaller than the first, owing to the fact that the slanting roof cuts off much space. Two large bedrooms, twin bedrooms, in fact, are provided, each with



The first floor plan is unusually spacious. Living room and dining room are only semi-separated, giving a beautiful vista. Casement windows provide plenty of light and ventilation.



Note the stair arrangement. Sufficient headroom is provided for by a gable in the rear roof. The placing of the linen closets is also interesting.

two closets and a large alcove with windows in it.

Both sides of the passage leading to the bathroom are lined with linen closets. There is a very unique point to be noticed in connection with this bathroom, and one which is not apparent from the plan. That is, that owing to the pitch of the roof there is little headroom in the bathroom, and the tub, which is of necessity a built-in tub, is sunk into the floor, only five or six inches projecting above the floor line.

The finish on the second floor is white enamel throughout, and the floors are of oak, the same as the first floor, except in the bathroom, which is tile floor, and tile finish to a height of five feet. Above this tile the wall is painted. The walls throughout the house are finished with washable paints, so that they can be readily kept clean with a minimum expenditure of energy. The house is heated with hot-air, has electric light, with charming silver-finished fixtures and frosted candle bulbs, and there is a gas water-heater in the basement. It is rare in a house of this type, built to sell, that all of these features are provided and that such attention has been given to detail. There can be no question but that a house of this type should sell very readily and should prove a most desirable home in which to dwell.

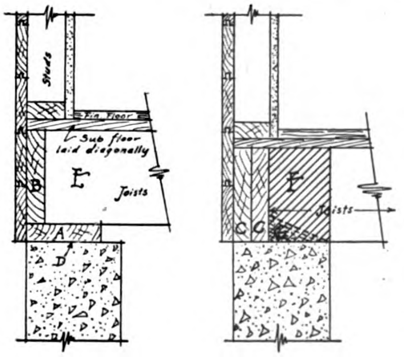
This house is located in the Schants Platte Development, Dayton, Ohio, and was designed by Louis Lott, architect, Dayton, Ohio.

The house is one of many just completed in the Schantz Platte Development.

How Box Sills and Partition Stops Are Built in the Middle West

By Thorwald Thorsen, Architect

It is common practice in ordinary house construction in Iowa to use box sills, as shown in Fig. 1. I have found difficulty in getting a tight joint at D, and it is also hard to beam fill the space E between the joists on account of having to build on top of the sill A. It may also be suggested that the piece A adds little if any to the strength of the sill.



Figs. 1 and 2 show two ways to build a box sill. Fig. 2 is the better, as there is less opportunity for cold air to leak through.

I have found the construction in Fig. 2 more satisfactory. The joists rest directly on the foundation as they would in a brick building. The space F can be beam filled with brick or other material resting directly on the foundation. If beam filling is too expensive a tight job may be had by plastering cement mortar in the corner G. This should be done after some time has been given for settlement, perhaps about the time the inside plastering is completed. Note that this takes practically no more lumber than in Fig. 1. In a still cheaper construction only one piece need be used around the outside at C and sill be made tighter and just as strong as Fig. 1.

Joist and Partition Stops

It is common practice in the Middle West to make the outside studs of two-story frame houses continuous through the two stories and to set the second floor joists on a strip as shown at C in

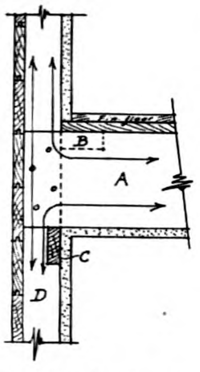


Fig. 3—Studs are often continuous through the two stories, joists resting on a ribbon, which is typical balloon framing.

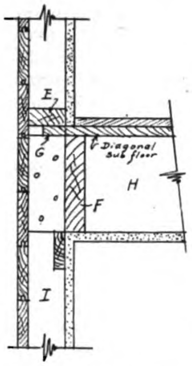


Fig. 4 shows how the continuous air space of the construction shown in Fig. 3 can be avoided. The necessity for such stopping to avoid fire hazard is emphasized in the laws passed by various municipalities forbidding balloon framing.

Fig. 3. Some carpenters fit pieces of 2 in. x 4 in. between the joists at B for nailing the diagonal sub-floor.

There are several very serious objections to this practice. Mice and vermin of all kinds have free travel once they get in at any place. In case of fire this can travel through walls and between joists, and I believe that this accounts largely for the rapid burning of an ordinary house when a fire gets under way. The most serious objection in my opinion, however, is the cold ceilings and floors resulting from the free circulation of air. In a cold winter the space D will naturally be colder than the inside temperature of the rooms due to loss of heat through the outside wall covering. The drawings show only sheathing, but this, of course, always has siding, shingles, plaster or other outside covering. The air at A, if warmer than D, will circulate constantly, as shown by arrows, to equalize the temperature making cold air under the floors and greater heat loss in the ceilings. If the construction is poor so that the wind actually blows into the space D, the heat conditions will be extremely bad. To remedy this at a very slight expense I have found the suggestions in Fig. 4 very practical. Pieces of joist, F, fitted between the floor joist on two sides of the house make perfect stops for the joist spaces. These pieces will save more fuel and add to the comfort and safety of the house many times their cost. These can be put in rapidly and a tight job made by sawing pieces of uniform length where studs are spaced fairly accurately, the pieces being sawed a little short and using a shingle wedge for driving tight before nailing, as in Fig. 5.

The diagonal sub-floor is then laid with rough ends projecting between studs as at G, after which pieces of studs, E, are fitted between the wall studs. The ends, G, make it easier to nail the pieces, E, in place, and makes the job of fitting the sub-floor to the outside wall very simple. I believe that if the foregoing suggestions could be made standard practice, our house construction would be considerably improved at practically no additional expense.

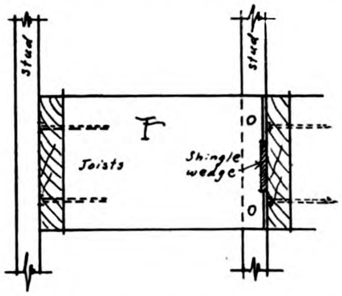


Fig. 5—Elevation of construction shown in Fig. 4.

A Dumbwaiter Helps Bring Household Efficiency

Many a Housewife Can Be Sold the Idea of Installing This Convenience in Her Home. Suggest It to Home Owners, and Secure the Contract

By Paul D. Otter

DICKENS, in "Little Dorrit," writes that "Mr. Meagles . . . gave a turn to the dumbwaiter on his right to twirl the sugar toward himself." Evidently that was a turntable affair giving an opportunity for everyone to help themselves in the absence of a maid in waiting.

The dumbwaiter herewith under discussion is for the purpose of reminder that now in this "built-in" era it is worth consideration and reinstatement as a space and step saver, not only in the large dwelling but in the small home or apartment. The form in Fig. 1 is shown more to stimulate thought in adopting something of its kind to individual requirements; measurements therefore could not fully be given. The box, however, 18 inches square by 24 inches high, would give a very serviceable stowaway space for a small family.

It is assumed that in this form of counterbalanced box or cupboard that the occupant of the home does not live in a flat, at least in the second, or fourth domain, for he could not invade the floor below with a part of his commissary department, although the idea is not without developing possibilities in the building of private chutes in flat or apartment buildings. More is it for the purpose of depressing certain foods to a lower or basement level, for a lower temperature and economy of room in a small kitchen.

A 2 x 4 is set from basement floor to under floor beam of kitchen; to this is screwed a smoothed, oiled hardwood slide 1½ inches x 2 inches. A box similar to a packing box is made as shown in Fig. 1, and also by plan Fig. 2, showing space on each side to loosely fit over hardwood slides on the 2 x 4. The floor is then cut through to permit of box being set within the slides on posts. The edge of flooring had better be cut back 1½ or 2 inches on two sides and a heading strip neatly

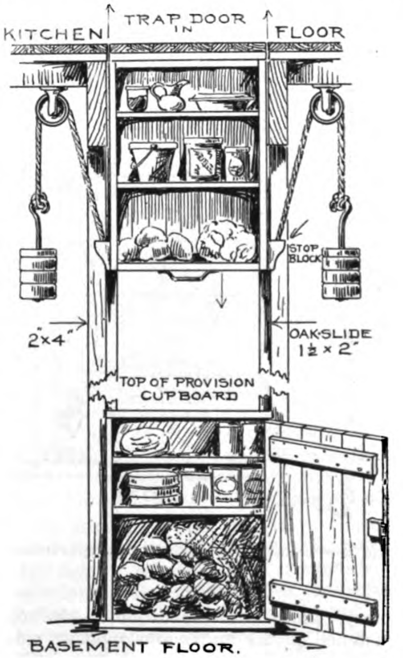


Fig. 1—Elevation of dumbwaiter with door off.

mitered in, as shown in floor plan, Fig. 2. A trap door must be made of similar flooring material to neatly fit the cut-out opening, and provided with flush hinges on one side and flush bolt and handle on opposite side, to lift up when it is desired to place on or take off anything from the shelves provided within the box. A smoothly fitted paneled door (not shown) should be provided, which should not interfere when being pulled up to limit of stop brackets shown in front of pulley rope.

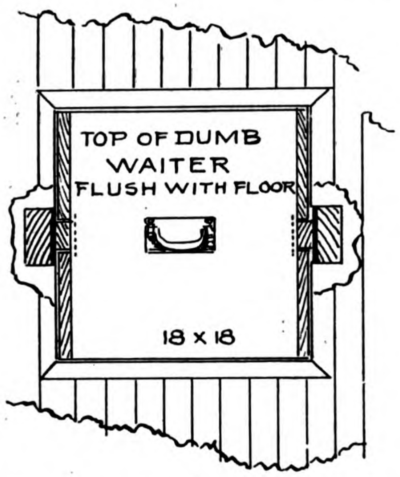


Fig. 2—Plan through trap hole in kitchen floor.

The stops are adjusted to keep the equilibrium of box when it has gone beyond guidance of slide or posts, or when it is almost fully height from kitchen floor. The weight, or counterbalance, must be determined by size of box, weight of it, possible load to ordinarily carry, and other conditions. A rope fastened on the under and opposite sides and as near to center width as possible, is passed through ordinary 4-inch pulley wheels secured to ceiling, and thence tied to weight hooks after height is determined upon.

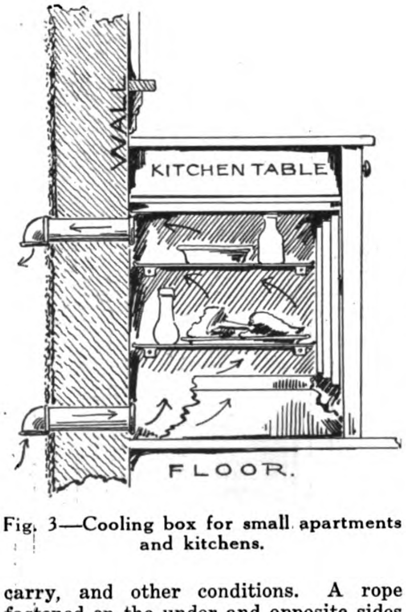


Fig. 3—Cooling box for small apartments and kitchens.

To amplify the advantages of the dumbwaiter when a cool storage basement is concerned, the lower fixed cupboard is suggested in the sketch, built within confines of 2 x 4 posts. This will be found most convenient as a nearby loading station for canned goods and certain vegetables. Drawing down dumbwaiter top of cupboard will facilitate reloading whenever one goes to basement, thereby saving steps and effort in carrying.

The small home without basement may with little expense be provided with a dumbwaiter and shaft sunk into earth several feet below ground floor, the sides and bottom of which have been faced with a good wall of cement, with floor properly drained, and ventilated from without by screened vents. Properly situated, such a convenience will greatly reduce ice expense.

In planning a house, or where basement, first and second floor room is advantageously situated, a chute may be projected to bedroom floor, permitting the use of dumbwaiter to carry clothes to laundry, in an upper removable basket, opening to chute being by snap doors at each floor, using the rope to lower or raise the carrying box.

The Cooling Chest

In the small kitchen or the flat, apartment or small home the keeping of food is quite a problem, it being difficult to have during many weeks and months of the winter a mean temperature between the often great extreme within and without. This mean temperature may be secured during the cold period of the winter by a permanently built chest with inlet and outlet pipe as shown in Fig. 3. This drawing shows end view of a double walled box with a door in front, of three thicknesses of material made in the same manner as a refrigerator door. Between walls, building paper and sawdust or cork shavings may be used to advantage.

The lower part of box may be trimmed with baseboard to conform to trim of room. The roof is built low enough for usual kitchen table to pass over it. The back of box consists of the wall, which is pierced at top and bottom with two holes for 2½-inch galvanized iron pipes having right angles projecting downward outside. The openings should be screened with fine copper wire gauze to keep out insects and dirt.

No measurements can be given, as this is like most conveniences of a "built-in" or "built-out" character, entirely dependent on individual conditions as to location and space available.

Frequently there is but one place to locate the kitchen table before a window. Under this, then, would be a very good place to build out the cooling chest permanently; or it could be so built that the top would be the working kitchen table, with the usual drawer space allowed for immediately under it.

Essentials in Planning Industrial Houses

Needs of the Worker—Room Sizes and Domestic Conveniences Necessary in the Small House.

By C. J. Thompson

In the consideration of a project for industrial housing it is important to bear in mind two things: First, that the people to be housed are human beings, and not only that, but that they comprise what is, perhaps, the most essential element in our economic population—labor; secondly, by regarding them in this light and making possible for them healthful happy surroundings in which they may lead contented, useful lives, the actual economic value of the workman is appreciably increased, a higher standard of loyalty and reliability insured, and his influence in the shop and as a citizen developed along constructive lines.

Manufacturers are rapidly learning to treat their employees' working environment as an important factor in efficient production. There is no doubt but that there is a significant relationship between the physical aspect of a factory and its output. Why, then, should it not be conceded that the worker's living environment has some bearing on his industrial capacities?

At this time, however, the problem does not simplify itself into a matter of increasing the capacity of an employee by improving his surroundings. On the contrary it is becoming impossible to hold, or even to obtain skilled labor, particularly in industries congested by war demands, unless attractive and comfortable living surroundings are available to the workman and his family.

This is not so much true of the single man as of the married man with a family, since the single man is usually content with one room, reasonably clean and well kept. The married man, however,

in addition to his own comfort, must take heed of the domestic efficiency of his home, must look to the environment in which he places his children, and must, in short, so provide for them that domestic worries and uncertainties may not affect his efficiency as a worker.

It must not be forgotten that the housewife is an important factor in this equation. It is, after all, ultimately more important that she be contented than that the head of the family be satisfied with his lot, for there is no denying the fact that unsettled domestic conditions can be held responsible for a great deal of labor turnover and industrial unrest.

Hence, in planning houses for industrial workers, we must bear in mind the needs and desires of the housewife first and last.

The first element to establish in this equation of industrial housing is the question of what constitutes a habitable house. Since a house consists chiefly of a group of rooms, we must consider the essential requirements of a proper room.

Size of Rooms for Workman's Home

First of all, the dimensions of the room must be sufficient. There must be adequate floor area, and the ceiling heights must not be too low. From 80 to 100 sq. ft. should be the minimum size of a bedroom. Government standards require one large bedroom 10 x 12 ft. or larger. Kitchenettes are a more variable quantity, government standards permitting them to be 70 sq. ft. when a separate dining room is provided. More latitude is possible in living rooms, but they should not contain less than 150 sq. ft., particularly when no separate dining room is planned for.

As for ceiling heights it should be remembered that 700 cu. ft. of air is hardly sufficient for two adults; plans must therefore be made accordingly. In general it may be said that no ceiling heights should be less than 8½ ft. There are some exponents of good housing, on the contrary, who feel that such high ceilings are unnecessary and absurd, and that 7′ 8″ or 8′ 0″ is quite sufficient. Assuredly it is true that there is more beauty and much more of a homelike quality about the low ceiled room, but there is room for argument from the standpoint of health.

Height of Window Heads Important

Next in importance to the height of ceiling is the height of window heads. The greatest possible height should be provided for, to insure direct light rays penetrating as far into the room as possible. In addition to this they should afford as much sunlight as possible and a means of ventilation. Needless to say no rooms should be without windows, and the net glass area for minimum requirements should not be less than 10 square ft. The ratio of one-seventh or one-eighth of window area to floor area is a very good one to follow and will insure plenty of light and air. Effort should be made in placing windows to provide for cross ventilation; when possible windows should be placed on more than one side of a room. Houses should not be so grouped or combined that windows will open on a small, enclosed court; this obviously makes the value of a window, however large, of little consequence. The better method, of course, is to plan either for houses entirely detached, or for row houses so arranged that that they shall not be more than two rooms deep.

Another point of importance is the matter of designing the entire house so as to make possible good maintenance and cleanliness. Simplicity is the prime factor here, combined with judgment as to floor surface, character of finish and materials, and good methods of ventilation. In recent years the demand for smooth impervious walls, the use of hardwood for floors and generally for interior woodwork has greatly increased.

All of the foregoing may be considered as the barest essentials in a housing scheme. The real merits of the question lie in the factors of beauty and economy which have been found to be equally vital.

There is no question but that the day of the old, flimsy three-decker, and other such shacks, is past. The working man has come to demand a certain amount of beauty and comfort as his right, and it is now our problem to see how this can be most simply and economically provided.

Beauty, as considered in relation to industrial housing, does not mean ornamentation. On the contrary the best and most permanently satisfactory results will always be found to come from simple designs. Hence, we may say that a simple house, with good proportions and sturdy, unpretentious lines, not aping something which it is not, a house thoroughly *livable*, should be the ideal of the industrial housing designer. He should first of all, consider the plan. This is the chief interest of the housewife, also, and is actually the thing which makes or mars the house. There must be no waste floor space; all the essentials must be provided; and the cost of the completed house must not be forgotten.

Essentials of a Workman's Home

What are the essentials of a workingman's home? It may be said that such a home should provide for the general functions of living—for the meeting place of the family, for cooking, eating, sleeping, bathing and the like. In providing for those things there are certain elements which are fixed, while others are more variable. In these days the necessity of a living room is not denied, but it is possible to combine its functions with those of the dining room, thus eliminating the expense incidental to planning for these rooms separately. In other instances it may be found preferable to combine the dining room with the kitchen. In this case it is usually desirable to provide a sort of alcove for the purpose, often with built-in furniture, which is extremely attractive and saves the workingman considerable expense in furnishing. A simple bench at either side and a broad table with sturdy supports at the ends is all that is required. When these are painted, say a soft green or a creamy yellow, they become very charming, and make the dining alcove more desirable oftentimes than the conventional, stereotyped dining room. When dressers and sink are provided in the kitchen, the pantry may usually be omitted.

The second floor requirements are not so elastic. A minimum of two bedrooms is usually necessary. The provision of a bathroom should be unquestioned. When bedrooms are provided only for members of the family they need not be larger than to contain the necessary furniture of bed, wardrobe, chair and dressing table; when closets are planned for, the wardrobe may be omitted. In the event that there is a bedroom for a lodger, it must be somewhat larger, since it constitutes his living as well as his sleeping quarters.

Are Fireplaces and Cellars Necessary?

The question of providing fireplaces and cellars is the most variable of all, depending first on the climate, and secondly on the size of the project (whether or not there would be greater economy in a central heating plant), and thirdly whether or not the worker to be housed is of a type to appreciate the responsibilities incidental to the care of a furnace. These questions can be met only as they arise, although it must be remembered that where cellar space is not provided some other arrangement must be made for the housing of fuel, tools and the other utilities usually kept in basements. Sometimes a large, covered rear entry will serve the purpose. In other cases the old fashioned woodshed will be built, but for average purposes it is safe to say that the cellar meets the need better than any other arrangement.

With regard to the æsthetic elements of the design, it should be remembered that this depends in large part on the innate ability of the designer. One cannot make hard and fast rules nor lay down rigid principles that will inevitably result in attractive houses. Good proportions, however, and simplicity in style may be said to count for more than anything else. Beyond that, planting about the house, particularly in the form of shrubbery to mark the entrances, and to fill unsightly corners if there are any, will help a great deal. Window boxes are also very attractive.

When it is possible to provide space for a small garden this should be done. It will not only effect economies in the working man's life, but will give him an added interest in his home and help to bind him pleasantly to his surroundings.

To summarize the phases of this sort of design, it may be said that, with a due regard for necessary economies, the solution of the problem lies in evolving houses which will be homes, not barracks, in which the worker will be content, and in which he will find those things that make his social and domestic environment complete.

Practical Methods and Details of Roof Framing—I

By Lawrence S. Keir

TRUSTING that the subject may be of some benefit to the younger brothers in the trade I am presenting these articles on roof framing. The subject is none of it new, although some of it may perhaps be presented in a slightly different manner than that which has before appeared in BUILDING AGE, as each of us has his own particular way of explaining a subject.

Every so often we have a new set of carpenter apprentices who are anxious to advance. Roof framing is one of the stumbling blocks in many a young fellow's way. On my own first attempt on a plain gable roof I found the length and cuts of the rafters by the simple if somewhat cumbersome method of tacking the rafters up against the end of the building and finding the plumb and foot cuts by use of a spirit level. This stunt was pulled off after working hours when there was little likelihood of any one having the laugh on me. I also remember I was a mighty proud boy when I framed my first hip roof and saw the rafters go up one by one and actually fit, probably more to my own astonishment than to any one elses, for I dare not tell any one it was my first hip roof.

It is the beginner who needs our help mostly, and for this reason the problems will be of the most simple everyday kind, leading gradually to the point where the apprentice should find little trouble in figuring out the more complicated problems by himself. It is sincerely hoped that the more advanced chips will feel free to criticise or suggest different methods. Only in this way can we acquire the most benefit.

Definition of Roof Terms

Perhaps the simplest of all roofs is the lean-to or shed roof. It is often used on porches, built-on kitchens, bay windows, wagon sheds, etc.

A knowledge of the steel square is a decided asset to the carpenter and builder. Almost every building mechanic knows something of the use of this helpful tool. Much of this knowledge is often fragmentary and the underlying principles may in many cases not be thoroughly understood.

This series, in four parts, is a practical and unusually clear explanation of the subject. The author is a builder and architect of wide experience in country house work, and possesses the happy faculty of putting his ideas in such language that they can be readily grasped.

We hope that other builders with steel square kinks will write us about some of their time savers. This interchange of knowledge will be of decided benefit to the craft in general.

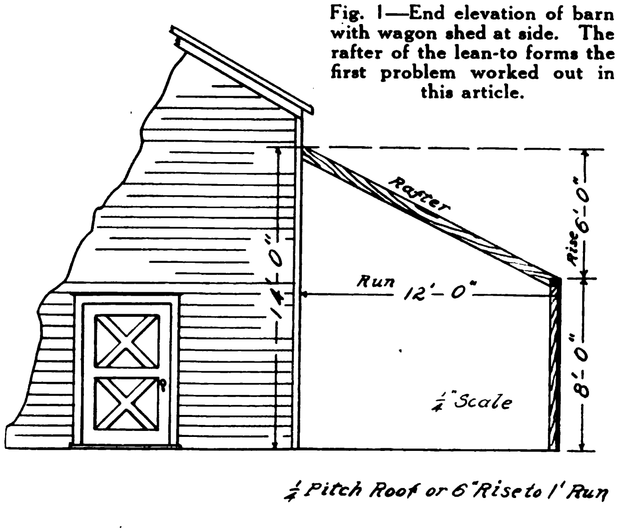


Fig. 1—End elevation of barn with wagon shed at side. The rafter of the lean-to forms the first problem worked out in this article.

Fig. 1 represents an end view of a barn with a wagon shed at the side. The dimensions given show the shed to be 12 ft. wide from side of barn to outside of shed. From foundation to top of plate is 8 ft. and from foundation to top edge of rafter where it connects with the side of the barn is 14 ft. The difference between 14 ft. and 8 ft. is 6 ft., and is known as the rise of the rafter. The distance from outside of barn to outside of shed is called the run of the rafter.

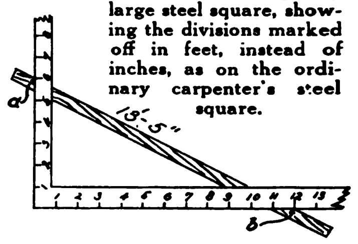


Fig. 2—An imaginary large steel square, showing the divisions marked off in feet, instead of inches, as on the ordinary carpenter's steel square.

The problem of course is to find the length of the rafter and the bevel where the rafter fits against the side of the barn which is the plumb cut, and the bevel where the rafter fits on the plate which is called the seat cut or foot cut.

Looking now at Fig. 2 it is seen that if we had a square large enough and with the divisions marked in feet instead of in inches, we could lay the square along the side of the rafter with the 6 ft. and 12 ft. marks even with the top edge of the rafter and mark a line from the 12 ft. mark along the blade which would give the foot cut and from the 6 ft. mark along the tongue of the square for the plumb cut.

Having no square large enough to mark the full length of the rafter in one operation the carpenter's steel square can be used in its stead. The steel square instead of being marked in divisions of one foot each is marked in inches, and as there are 12 in. to the foot, it will be necessary to apply the square 12 times, or once for each foot of run. Instead of using the 12 ft. and 6 ft. marks we use the 12 in. and 6 in. marks along the top edge of the rafter, being careful to mark the points x x x x, etc., very accurately, as shown in full in Fig. 3.

The same result could be obtained by doubling the numbers 6 and 12 and using 12 in. and 24 in., as in Fig. 4. In this case the square need be applied just half the number of times, which is quicker and perhaps slightly more accurate.

Another method would be to measure across the square with the rule or another square, from the 6 in. mark to the 12 in. mark. It will be found that the distance is 13 5/12 in. As we are working by the scale of 1 in. = 1 ft., each inch represents one foot and each twelfth inch represents an inch on the rafter. In other words, the rafter is 13 ft. 5 in. long. Apply the square with the 6 in. mark at the top of the rafter, as shown at (a) Fig. 5, and it gives the plumb cut. Next measure from this point down the top edge of the rafter 13 ft. 5 in. to (b), Fig. 5, and apply the square again with the 12 in. mark at (b) and a mark along the blade gives the foot cut.

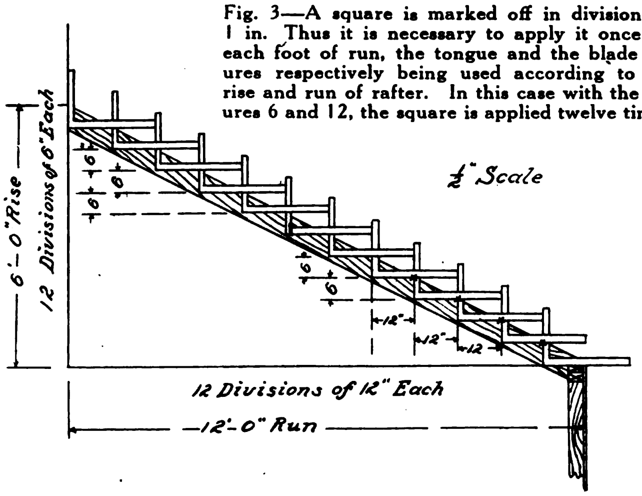


Fig. 3—A square is marked off in divisions of 1 in. Thus it is necessary to apply it once for each foot of run, the tongue and the blade figures respectively being used according to the rise and run of rafter. In this case with the figures 6 and 12, the square is applied twelve times.

Instead of cutting all the way across the foot of the rafter as from d to e in Fig. 6, it is sometimes desirable to leave a shoulder as at h. This is done by measuring along the foot cut from d toward e a distance of 5 in. (1 in. for rough sheathing and 4 in. for width of plate) to point marked f. From f cut square down to g.

Fig. 7 shows a much stronger method of fitting the foot of the rafter to the plate, as it gives nearly the full depth at the bearing point. After the square is laid on for the foot cut in the usual way as at a, mark the 12 in. point at e, then scribe the line c, d along the tongue of the square and slide the square along this line from c toward d until the 7 in. mark on the blade is even with the lower edge of the rafter as at b. The mark along the lower edge of the blade a distance of 5 in. or to the 12 in. mark at f, which gives the mark for the foot cut and a line drawn square up from the 12 in. mark at f shows where to cut off the end of the rafter when there is to be no overhang or tail. In the case of a 2 x 6 rafter, this brings the whole rafter 3⅞ in. higher up, as at g. Fig. 7. In most cases this would make no particular difference, but as in the case of a veranda roof where the top of the rafter must come just under a window sill, something must be done to take up this difference. Perhaps the simplest way of all would be to frame the plate 3⅞ in. lower. Another method would be to start at a point a in Fig. 8 and measure 13 ft. 5 in. the length of the rafter to a point 3¼ in. square down from the top edge of the rafter, the distance given at h, Fig. 7, and represented at b in Fig. 8. Now with a straight edge or chalk line make the line between the two points a and b. By using the square along this line instead of along the top edge of the rafter mark off the plumb cut and foot cut. The 6 in. and 12 in. marks are used the same as before.

If in this last method there should at any time be occasion to use short rafters such as might be the case in going past an outside chimney projecting through the veranda roof, it would be necessary to lay off the length rafter required by using the square along the line a, b starting the spacing of the square at the foot of the rafters and working up toward the top end until the required length was found. The first rafter would of course be used as a pattern for as many more as needed.

A third way to bring the top of the rafter to the proper height would be to divide the distance or amount of rise it is necessary to loose by the number of feet of run in the rafter and subtract one of these divisions from the rise each time

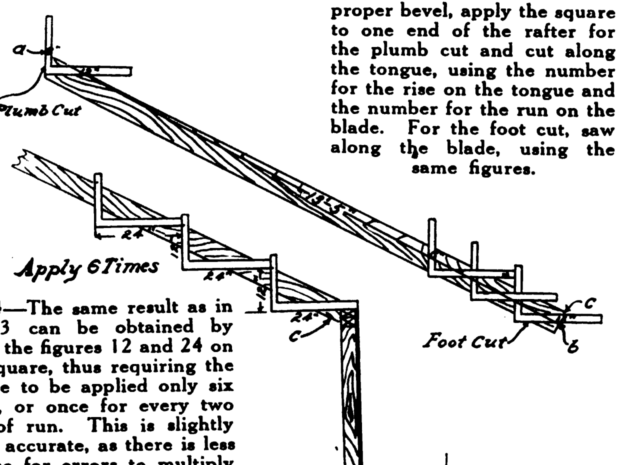


Fig. 5—To cut the rafter with proper bevel, apply the square to one end of the rafter for the plumb cut and cut along the tongue, using the number for the rise on the tongue and the number for the run on the blade. For the foot cut, saw along the blade, using the same figures.

Fig. 4—The same result as in Fig. 3 can be obtained by using the figures 12 and 24 on the square, thus requiring the square to be applied only six times, or once for every two feet of run. This is slightly more accurate, as there is less chance for errors to multiply in applying the square.

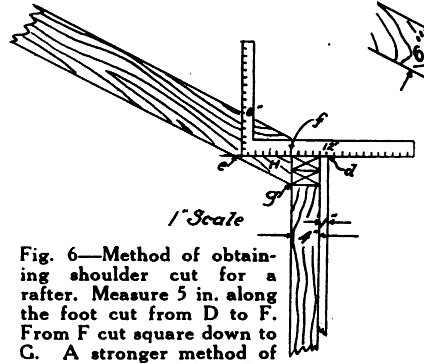


Fig. 6—Method of obtaining shoulder cut for a rafter. Measure 5 in. along the foot cut from D to F. From F cut square down to G. A stronger method of fitting the foot of the rafter to the plate is shown in Fig. 7.

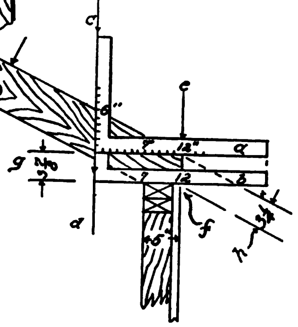


Fig. 7—This method of fitting the foot of the rafter is good because it gives nearly the full depth at the bearing point.

we lay out 1 ft. of run on the rafter. In this case the marks on the square would be brought even with the top edge of the rafter at all times. Take the rafter in question for instance. It is desired to loose 4 in. nearly, that being near enough for all practical purposes. Now there is 12 ft. of run, so we divide 4 in. by 12 which gives us 1/3 in. Subtract 1/3 in. from 6 in., the rise for 1 ft. of run and it leaves us 5 2/3 in. as the rise. Take 12 in. for the run and 5 2/3 in. for the rise and apply 12 times and we have the same length and cuts on the rafter shown at Fig. 8 as the 12 in. and 6 in. marks gave on the same rafter when applied along the line a, b with this exception. After the length of rafter is found, we must slide the square as was shown in Fig. 7 along the line c, d until the length of the foot cut is found. Both of the last two methods change the pitch of the roof slightly.

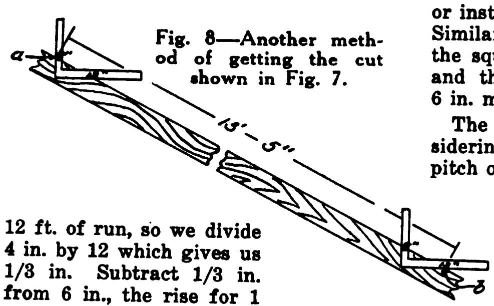


Fig. 8—Another method of getting the cut shown in Fig. 7.

Referring again to Fig. 3 it is easily seen that if the shed had been only 10 ft. wide instead of 12 ft. the square would be applied only ten times and the total rise of rafter would be less by 2 x 6 in. or instead of 6 ft. the rise would be 5 ft. Similarly if the shed had been 2 ft. under, the square would be applied twice more and the rise would be increased twice 6 in. making the rise 7 ft.

The rafter we have been so far considering is what is known ¼ pitch. The pitch of a roof is arrived at by assuming a building 24 ft. wide with a plain gable roof. The 24 ft. width of the building is divided by the number of feet rise a common rafter makes running from the outer edge of the plate to the top of the ridge pole at the center line of the building or a run of 12 ft. Thus with a roof the rafters of which rise 6 ft. in every 12 ft. of run, we divide 24 by 6 and find that 6 is ¼ of 24 and the roof is a 6 and 12 cut, or ¼ pitch. An 8 and 12 cut roof is 1/3 pitch; 8 being 1/3 of 24, and a 12 x 12 cut is ½ pitch because 12 is ½ of 24, etc.

(To be Continued)

Let the Housing Problem Be Solved *Right*

By Noble Foster Hoggson

There is, and has been for some time, a shortage of houses for workmen. The situation has been serious—"acute" is the word most commonly used to describe it. It was necessary that adequate housing be provided for industrial workers. It appeared to be an "emergency" case.

Any emergency these days brings forth scores of freak solutions. The Patent Office is swamped with devices for winning the war. So with housing. All sorts and kinds of schemes for temporary shelter and permanent developments have been proposed. But the danger in providing hastily thrown up shacks for workers is slight compared to the great danger of freak permanent developments.

I do not mean that we should avoid taking advantage of innovations and betterments. Leave it to the genius of this country to adopt the latest and best ideas and enhance their value by improvements.

But, at the same time, this is not the moment for reckless experimentation. Industrial housing is fairly a new problem with us, but an old one in England. The British have solved their problem. While conditions here in America are somewhat different, the underlying principles are the same, so we have a firm basis on which to work. The preliminary experimentation has been performed for us. We have the results to work from.

Therefore let us avoid freaks. There has been a suggestion advanced that model tenements be erected in these new industrial villages. Fancy, with all the land that is available in these small communities, enough room for every man to have a house and a yard and a garden, where a community can spread out, we are asked to build tenements, coops for humans, buildings going up with the foul air, with congestion, and all its evils.

In London, where congestion has ruled, the tenement has been doomed. The London slums are being done away with, and tenements are forerunners of slums. No, we don't want any tenements in these new industrial villages, nor do we want barracks. Well planned community houses or group houses, yes. They have individuality, which is only one of their manifold advantages.

The Government, assisted by some of the ablest architects, builders, welfare workers and industrial experts, has worked for months to formulate a definite housing policy. A set of standards has been "recommended." Recommendations in these days, coming from official sources, generally may be construed as orders. With such an outstanding figure as Mr. Otto Eidlitz, the New York builder, in charge of a large part of housing work to be done by the Government, or with the aid of the Government, we may rest assured that the developments carried out under his responsibility will be on a high plane of practical, efficient idealism.

All other developments of a private nature should measure up to the same high plane. Freak plans, freak methods, will never do. After all, the man to be satisfied is the worker and his family. C. Stanley Taylor, in *The Hoggson Magazine*, reports the results of an analysis of housing conditions which he made for the Government in the Middle West. During his investigations he questioned the general manager of a munitions concern regarding the benefits which had accrued through providing houses for its workmen. The general manager said:

"The best mechanics who come here for jobs are married men who journey from distant towns and cities, attracted by the wage scale. They leave their families behind while they come to 'try out' the place. They are most usually good workmen. After finding a room for temporary quarters, they look around for a house to rent. There are none. The man likes his job. He likes us. But he computes the additional cost of living apart from his family, so he goes back, or seeks another place where he may find a home. We have lost nine out of every ten married men we have hired during the last year: the reason is simply because they were human and wanted to live 'at home.' They are the best kind, the home-loving, steady-going, dependable workmen. We had to have them. That's why we build homes!"

Yes, that's why that concern is building homes, and it was noticeable that the general manager said *homes* and not houses, and in that one word "homes" he laid bare the secret of success of industrial housing viewed from the standpoint of investment. Build homes —not merely houses!

And away with all freak theories!

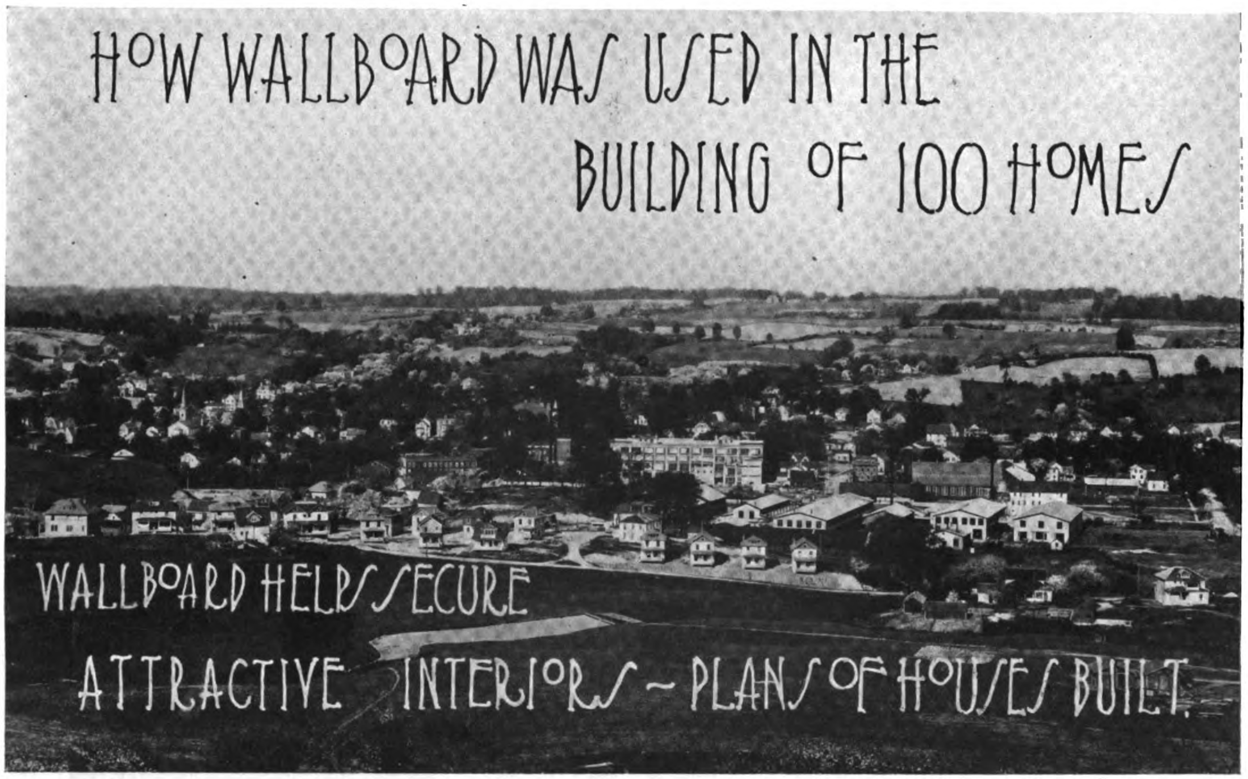
After the War

In the United States, in some localities at least, the building business is all shot to pieces. But the United States is better off than Europe at that. In Europe it isn't the building business that is shot to pieces, but the buildings.

After the war there will be a lot of building in both places. By foregoing a little building now we are making it sure that, while our building business may be shot to pieces for a while, our buildings never will.

HOW WALLBOARD WAS USED IN THE BUILDING OF 100 HOMES

WALLBOARD HELPS SECURE ATTRACTIVE INTERIORS—PLANS OF HOUSES BUILT.



By L. H. Harvey

Groton, N. Y., a town of fifteen hundred population, during the past two years has witnessed the erection of nearly one hundred homes for the employees of The Corona Typewriter Co. modern, well designed, cheerful dwellings that are a credit to Groton as well as to the company that built them.

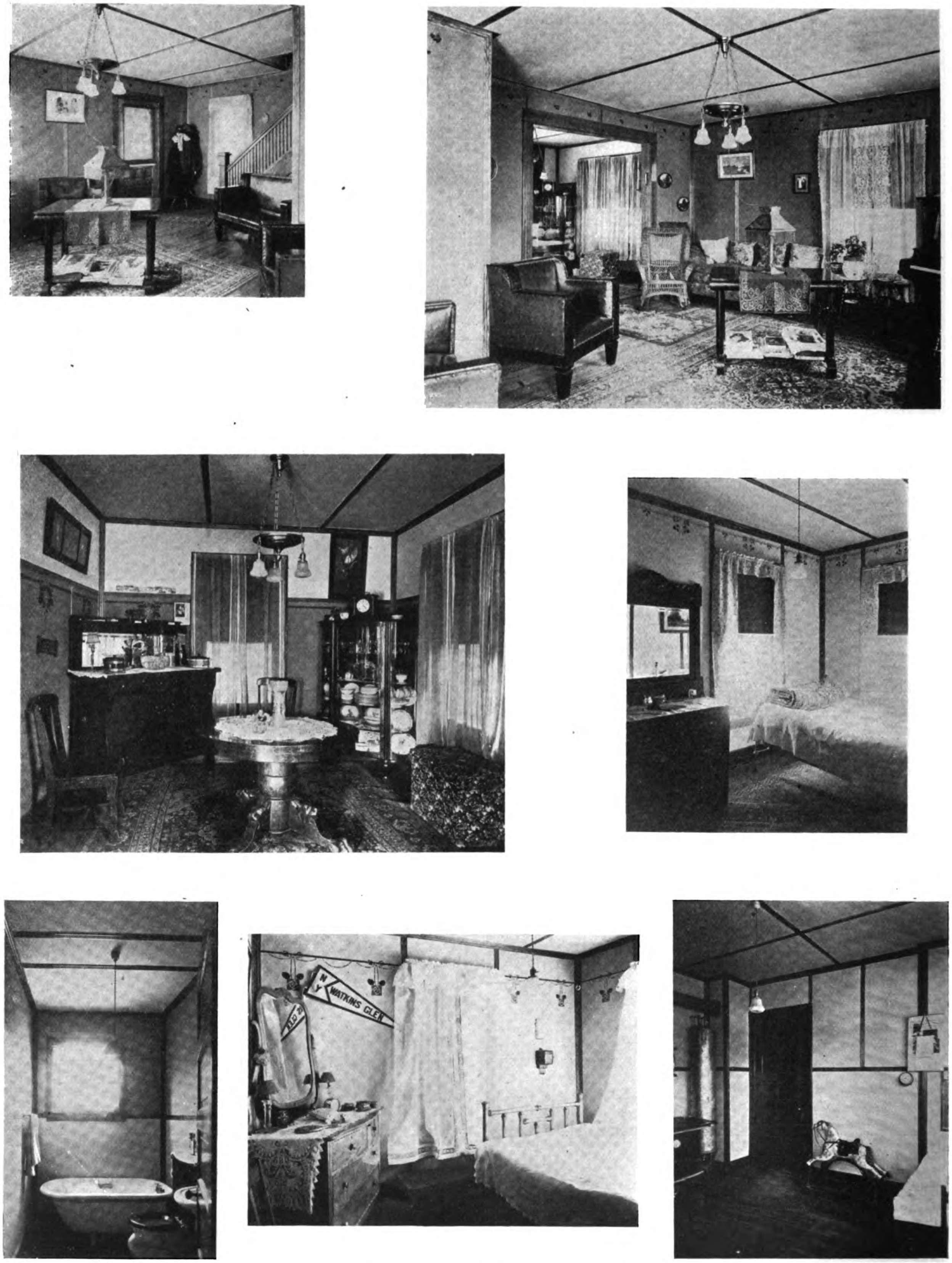
This event possessed the same importance for Groton that it would have had for thousands of similar factory towns throughout the country. An industry had located there and grown so rapidly that the number of its employees outstripped the community's available homes. The result was that the local building facilities were not developing new homes frequently enough to meet the demand.

The condition was not one that was peculiar to Groton. It is the present situation in most industrial centers, a situation that has become increasingly troublesome. The importance of the problem is recognized by the government and a great deal of attention is being given to industrial housing by architects, contractors and builders. The practical and successful way in which the situation was handled at Groton offers a great many suggestions for those facing industrial housing problems in other communities both large and small.

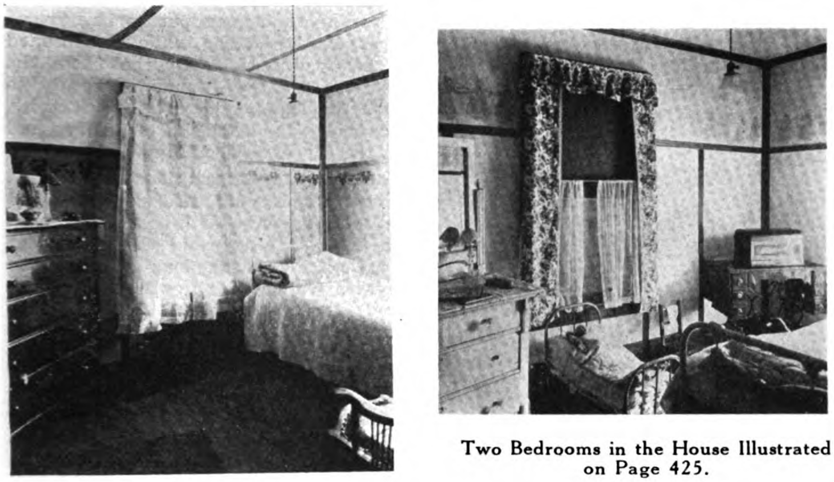
Typewriter making requires skilled mechanics and the men who came to the Corona plant were anxious to become established, with their families, in homes that would be a pleasure to them. Mr. Benjamin Conger, president of the Corona company, sensed the urgency of the situation and organized a subsidiary company, the Groton Building & Improvement Company, to take up the erection of a colony of homes for the Corona workers.

There was an undeveloped tract of promising residential land in the immediate vicinity of the Corona plant and the manner in which it has been developed is shown by the panel head. The erection work was begun some two years

Floor Plans and Finished Appearance of One of the Houses Popular in the Development. The pictures on the following page show how wallboard was used throughout the house.



Wallboard Was Used Throughout the House Illustrated on the Preceding Page, Interiors of Which Are Here Shown. These pictures give a very good idea of the decorative possibilities of wallboard.

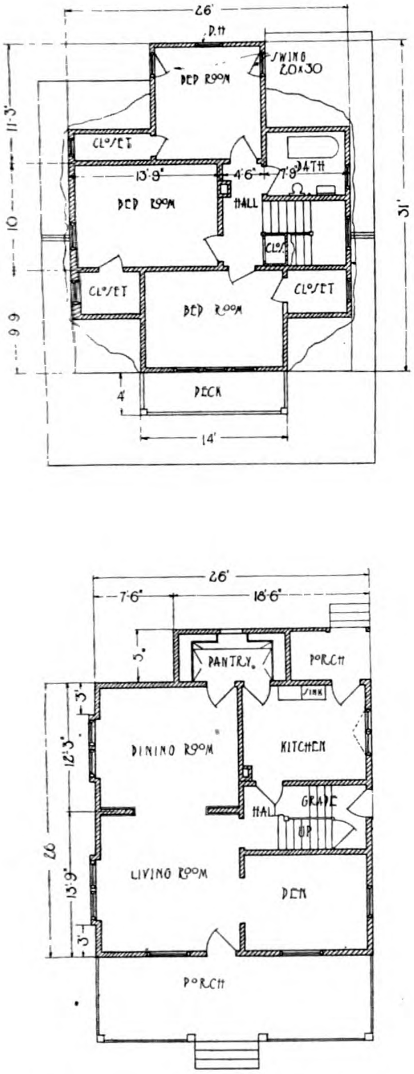


Two Bedrooms in the House Illustrated on Page 425.

ago, a photograph on this page showing a street of the first homes.

As the houses were completed they were made available for the Corona employees in two ways. They were sold on an easy payment plan to the more skilled men and rented to the other employees. In either case no attempt was made at securing a profit, the charges being figured on the basis of the actual cost price of the buildings.

To meet the requirements and tastes of the various employees, as well as to assure an attractive and well balanced residential section, bungalows, semi-bungalows, single-family houses, two-family flats and even three-family houses were built. In this way a high-class type of home was provided for the more important personnel of the organization and at the same time good looking, sani-



Floor Plans of the House Illustrated at the Right.

One of the Streets in the Development.

A Popular Bungalow Type of House, the Second in the Row Illustrated Above. Note the plain, serviceable garage.

tary and comfortable homes were constructed for the employees of moderate earning power.

Frame houses were built exclusively. The basements were laid with poured concrete. Most of the houses were of clapboard and shingle construction, although several were built with stucco exteriors and the upper floors of many had an outside construction of imitation wood brick veneer. Prepared roofing was used and the houses were heated with pipeless furnaces.

The first homes were finished with lath and plaster. Those erected subsequently have been finished with wallboard, more than two carloads being required last year. President Conger explains his preference for wallboard not because it is cheaper but because it has made a more permanent finish, offered distinctive decorative effects and speeded up the completion of the work.

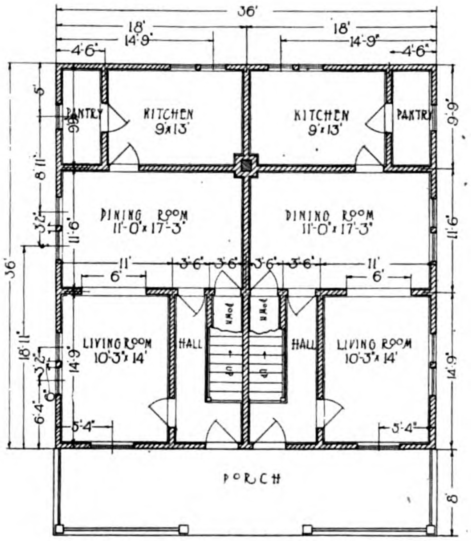
The photograph reproduced on page 425 shows the erection of the single family house with the first and second-floor plans. This house is here illustrated in detail as it is the kind of home that is most suitable for the majority of industrial housing activities.

The use of wallboard permitted the execution of a simple but expeditious plan in the completion of the inside work. The carpenters who nailed the board to the studding and joists put up the framing of another house while the board was being decorated. By the time the paint was dry they would be ready to return and apply the decorative trim, which meant the avoidance of delays and kept the carpenters continuously busy.

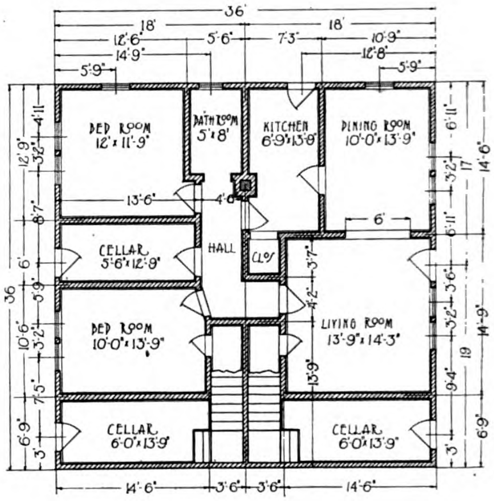
The essential precautions for good wallboard work were carefully observed in all of the homes, with the result that each home is a splendid exposition of the artistic and harmonious effects to be had with wallboard. Headers were inserted wherever required, and special pains were taken with the intermediate nailing so that it is entirely unnoticeable. The decoration was splendidly executed throughout, one of the leading flat-tone and blending systems being used. Appropriate stenciling adds considerable originality to the finished effect and the decorative trim is well stained.

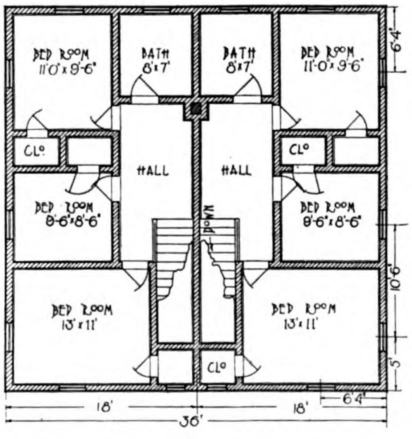
The three-family house was unusual in that it provides room for one family in the basement and the first and second floors are divided into up and downstair quarters for two families.

The planning and erection of the homes has been under the supervision of L. D. Townley, who is the architect and superintendent of construction of the Groton Building and Improvement Company. Mr. Harry Hubbard is the head contractor, and the decoration was done under the direction of J. H. Hunt. It is not expected that the present colony will more than suffice for the immediate needs of the employees, and additional homes will probably be erected in the next few years, the original ground plans having been adopted so that they provide ample facilities for future extension.



The Three Family Type of House Illustrated on This Page Is an Economical Design That Is Popular in Many Sections of the Country.





Some Echoes of the Noon Hour—XIII

Shorty Tells About an Old Barn Framer Whose Wisdom Teeth Were Early Cut in the Skin Game

By Edward H. Crussell

Shorty had been taking a vacation of a couple of weeks, visiting the "Old Folks" on the farm. He was now back, brown as an Indian, covered with mosquito bites, and full of curious information. He had left the job, with the avowed intention of helping in the harvest, but, as the Kid pointed out, it was evident that the only people he had helped were the women folks, who would now have much less canning to do because Shorty had eaten all the surplus.

Shorty had brought this upon himself by his description of the meals he had eaten on the farm, said descriptions having made the others envious.

"There's the place to be," he said, "talk about being self-supporting, coffee and tea were the only things I saw them use, while I was there, that they didn't produce themselves. Even these were sweetened with maple sugar."

"Wouldn't that sort of fare get kind of monotonous?" asked Scotty, deprecatingly.

"I wish I could have stayed until it had got so with me," was the reply. "Oh boy! Hot cakes and honey, home cured ham, new laid eggs, fresh milk, fresh butter, home made bread, home made cheese, fried chicken, cotton tail, brook trout, fresh berries and vegetables — ! Yes, it gets monotonous, and so, I expect, will heaven."

"Hunger makes a good sauce," quoted Farmer, slyly, "I expect the additional exercise you were taking was what made things taste so good. Did they work you pretty hard?"

Shorty started to deny this emphatically, but discovering the trap in time, slowed down and explained that it had been a long time since he had been home and in consequence there had been much visiting to do; his time had been so occupied with it, that he had not done as much farming as he would have liked.

"First man I looked up," said he, "was old Ira Cameron. Ira is the barn farmer of that district, and the man who first fired my youthful ambitions with the idea of becoming a woodworker. Ira still sticks to old fashioned methods; he had just finished an old style heavy timber barn, with mortise and tenon joints, so he hitched up the flivver and took me over to see it, setting it forth as his desire to get a 'city expert's' opinion of it. I expect there was plenty of room for criticism and I felt glad that neither Bliss, Scotty nor Farmer, were along, to point out that his posts were too large and his tenons too small. Ira seems to have a rather poor sense of proportion, and any of our present day designers could pick out all sorts of things wrong with his work, though personally I am of the opinion that his work will be standing, long after those who criticized it had fallen to pieces. Ira may not be a top notch designer, but his executive ability always won my admiration. Years ago he made the statement that he would like to see the barn that he could not raise in half-a-day, and since then, the people around there have been trying to stick him but they have never managed to do so. He stands six feet two; weighs about two twenty-five, and although he is well past sixty, still claims to be able to do two men's work. Ordinary times, he's rather slow spoken, and apparently, slow moving, but to see him at a 'raising,' is a circus, a vaudeville show and a picnic combined. He'll tell someone to fetch him a mallet; will spell the name of it; explain that it's a wooden hammer, a block of wood with a wooden handle; and then run and get it himself before the other fellow has taken two steps.

"Our wagon broke while we were by the country store, so we went in there to make a new whiffletree. The gang there kidded the life out of us."

"I remember the first raising I ever saw him at; he sent two fellows to fetch him a piece of timber, a piece about 8 x 8 x 16, they came staggering along with it on their shoulders, grumbling and complaining that they needed more help. Ira wasn't paying any attention, apparently, but just as they crossed a little depression in the ground, he dropped what he was doing, ran between them, got his shoulder under the stick, took it away from them and ran with it to where it was needed.

"A little later, while raising one of the bents, a relative of the man for whom the barn was being built did not follow up fast enough, so that his pike pole came loose and dropped on a fellow in front; striking on the rim of his straw hat and driving the rim down onto his shoulders while the crown was left on his head. Almost before the pole struck, Ira, still keeping hold of his own pole, which was on his shoulder, reached forward, hooked his long boney fingers in the culprit's waistband and slung him to the rear with the remark: 'Take yourself off the lot, we can't have you standing around here killing good men.' Talk about the joy of personal achievement, I'm telling you that anyone who had gone through a raising with Ira went home feeling that he had earned a night's repose."

"Gosh yes!" said Farmer, "It fills my back full of ache and my hands full of blisters just to hear you tell about it; what must the real thing be like."

Shorty, disregarding the interruption, continued. "The county supervisors were asking for bids on a road bridge while I was there, and I drove into town with Ira the day he put in his bid. His method would have made David Harum feel like a piker. 'I don't want this job,' he explained to me, 'but times are hard and I think I see a way to make an honest dollar out of it. I have a pretty good reputation around here and can land about any job the county has, as long as I don't run too far over the other fellow's figures. There's only one other man likely to bid on this job; he comes into town

from the other side and I figure on running right through town and meeting him on the road.'

"We did this, and met the other man about two miles out. He had his wife with him, so Ira suggested he should get into our car, as he had something of importance to impart. 'Now look here,' said Ira, after the change had been effected, 'are you going to bid on this bridge?' The other hummed and hawed for a while and then said he 'calc'lated to.' 'Well,' said Ira, 'there's no use us cutting each others throats, I'll tell you what we'll do; we'll show each other our bids and the one that has the lowest shall give the other twenty-five dollars, put his bid up to within ten dollars of the other one's figure, and, if he gets the job, split with the other the difference between what he makes and what he expected to make.' After he had explained this proposition backward, forward and diagonally, the other finally agreed. Ira's figure was twenty-two hundred and fifty dollars; (Good care he took to have it high enough) the other's was nineteen hundred; he gave Ira twenty-five dollars and increased his bid to twenty-two hundred, after which, they separated and drove into town from different ways.

"They met again at the court house, and were going to deposit their bids, when Ira suggested, 'Stop a bit, let's wait until time is about up, there might possibly be some other bidder; if there is, I'll buy him off for ten dollars.'

"There was no other bidder, and after a secret conference between one of the supervisors and Ira, our friend got the contract, for twenty-two hundred. On the way home, I suggested to Ira, that possibly his friend might refuse to divide with him at the close of the job. He looked me over for a moment and then drawled, 'Wal, I suppose twenty-five dollars looks kinda small to you city fellers, but down here we think twenty-five dollars a purty good day's work. We drove in silence for a mile or more and then he continued, 'He'll divide if there's anything to divide, or he won't get another county job from now till the day of his death."

"Ira fixed it up so that whichever way the bid went he was sure to make something."

"And that's the simple country jay that first fired your ambition to become a woodworker, is it?" asked Old George, "I think you did right to move away from him—"

"Go ahead Shorty," interrupted the Kid, "tell us some more, it's as good as a movie, I always was crazy about these stories of pirates, highwaymen and such."

"I've told you enough about Ira, replied Shorty, "I want to tell you now, about the Saturday night we went over to the line store together. A line store," he explained to the Kid, "is a store built on the dividing line between the United States and Canada, with the intention of evading the custom laws of both countries. Ira uses a flivver when he's on business, but for pleasure purposes, he has a trotting mare that he is very proud of. The whiffletree got broken while he was showing off the mare's paces and the first thing we did on arriving at the store was to borrow a brace and bit and a drawknife, so that we could cobble up another one that would do to get home with. There was the usual Saturday evening country gathering at the store, the members of which left their regular duties to assist us with their comments in making the whiffletree. I wish I could reproduce for you the words and dialect, but I can't; if I could, I'd go on the big time with it. Their talk was chiefly confined to incidents in the life of a certain Jerry Flint, a one-time wagon maker of those parts, who, according to the historians then present, could easily have made a top buggy in the time it took me and Ira to make the whiffletree.

"I suggested that Jerry must have been a speedy worker, but no; it seemed that Jerry's method was to start with the green wood, just as it was cut, and by the time he had it finished the wood would be thoroughly dry. This, of course, was the country way of telling us how slow we were with the whiffletree. I'm giving it to you in condensed form, without the asides and comments, but I think you will realize the laughing there was, at putting over such a joke as this, on the smart Aleck from the city.

"It seemed that another peculiarity of Jerry's was to get along with next to no tools at all. A hand axe and a drawknife were more than enough. I bit again, and asked how he bored the holes, and in a stillness like that of the tomb at midnight, a grey whiskered old great grandfather answered: 'He shot 'em through with a gun.'

The gang greeted this with laughter, and Bliss said: "I don't want to interrupt your narrative at all, Shorty, but that incident reminds me that I read somewhere of them cutting an opening for a manhole in a large steel water pipe, by means of a rifle and steelclad bullets. It illustrates how even a burlesque may sometimes indicate a way to handle an emergency."

"When the fellow's pike pole came loose, busting the next man's straw hat, Ira gave him all that was coming to him."

"Don't apologize for trying to show that my foolish talk might possibly be of some use," grinned Shorty, "And as for the interruption, there goes the whistle; I had another incident to tell you of, but I'll have to put that off until to-morrow."

(To be continued)

Cement Production in 1917

Statistics of the cement industry in the United States in 1917, prepared by the United States Geological Survey, indicate that the total shipments of Portland cement from the mills amounted to 90,703,474 barrels, valued in bulk at the mills at $122,745,088. This represents a decrease in quantity of 4.1 per cent and an increase in value of 17.8 per cent compared with 1916.

The production of Portland cement in 1917 was 92,814,202 barrels, compared with 91,521,198 barrels in 1916, an increase of 1.4 per cent. This production holds the record, the next highest output, 92,097,131 barrels, having been in 1913.

Not only was the largest output of Portland cement made in 1917, but the factory price received during the year throughout the country was high.

Various Ways in Which the Industrial Housing Project Is Financed

By J. Natté

It is logical that much consideration should be given to the question of the investment which housing projects constitute. The permanency of the housing, the aesthetic issues arising from the wholesale erection of low cost houses, as well as the development of some sort of elastic system of credit are all problems which arise in this connection.

It is impossible to state definitely what return can be expected from an investment of this sort, owing to the variable status of building costs and land values, nor is it possible to establish definite facts regarding certain other phases of the issue. There are also certain primary considerations which must be got out of the way before one can begin to take stock of the financial prospects. First of all is the question of what disposal is expected to be made of the houses when built. Are they to be sold to the worker on time payments? Are they to be rented? Often the manufacturer sells the houses at cost, counting on the increased contentment of the worker, the reduction in labor turnover, and his good name as an employer for returns on the investment.

In other cases co-operative bank stock serves as a medium of exchange, obviating to some extent the paternal aspect of the situation.

For the speculative builder, however, these problems are not so vital. He plans either to sell or to rent for a profit.

Workers Spend 20 per cent of Earnings for Rent

It is generally conceded that a worker is able to expend from 20 to 22 per cent of his earnings for rent. It is also usually true that the skilled mechanic is the type of laborer who requires permanent housing, in large part. These men seldom earn less than $20 a week. Supposing that they are able to pay 22 per cent of their wages for rent, this gives them a minimum annual expediture for rent of $220.

Gross Income Should Be at Least 10 per cent

General observation shows that the gross income necessary to provide 5 per cent earnings on capital investment should be at least 10 per cent. Taking the rental of $220 a year, the cheapest houses we can consider building will cost $2,200, this to include land, street improvements, and the like. It is obvious that this is hardly sufficient to build the type of house which the skilled laborer demands.

There are three general methods of operation which will cover this situation which would have to be chosen to meet the needs of individual cases, and which would undoubtedly need to be modified in each case. They are:

1. The housing company, organized by manufacturers or other community interests, but operated independently.

2. The co-partnership scheme, in which the workman buys, not his home, but shares in a co-operative company which owns and operates the industrial village.

How do you raise money for buildings? If you saw a chance to build a few houses which would bring you a profit, how would you go about financing the project?

Many builders to-day are asking just these questions. Will you help answer them? Building Age wants your experiences in obtaining money for small housing projects. Tell us how you went about getting the money and what arguments you used.

Will you help other builders by relating your experiences?

3. The method whereby the employer provides and operates the development for the benefit of his employers.

All of these schemes have been put into successful use. One may point to the Bridgeport, Conn., housing company as a successful example of the first type; the second and third schemes have been worked out more thoroughly in England than in this country, but they are also beginning to find favor here.

The first scheme is the one to interest the speculative builder, but has the weakness that all speculative building projects have; namely that the type of building provided may be of a very inferior sort and react to the harm of the working man. We have seen enough of this sort of thing in this country so that we should be prepared to avoid it. And there is no blinking the fact that it is difficult for the independent builder, particularly the small investor, to build good, permanent workingmen's houses at profit.

In carrying out the second scheme a stock company is formed in which the ownership of all land and buildings is placed. The person wishing to live in this community buys enough stock, on easy payment plans, to enable him to occupy the house which he may select. He does not own either land or building, but he has the right to occupy the designated land and building. All increment land values, resulting from centralization of population, accrues the benefit of the stockholders, as well as any income from the rental of stores, manufacturing sites and the like. Such a scheme offers maximum flexibility. If a man wishes to move from a community, all he needs to sell is his stock, which is often a much simpler matter than selling a house and lot.

The third method requires a much larger permanent investment and smacks of paternalism, a thing which the American workingman resents. Some very fine housing projects have been developed along this line, however, among them the famous Port Sunlight in England, that of the Goodyear Rubber Company of Akron, Ohio, etc.

Depreciation, Etc., Must Be Figured

These questions inevitably bring in their wake such problems as depreciation, the demands of workers of different nationalities and degree of skilled efficiency. Class differences are to be seen even here, and due respect must be given to the demands of clerical workers, skilled mechanics and common labor.

Will Unions Object to Paternalism in Housing?

Another question on which it is interesting to speculate is whether or not organized labor is not soon going to have something to say in the matter of union men purchasing houses in those industrial developments which bind them too closely to one manufacturer. It is to be hoped, however, that through the war there may come greater co-operation between capital and labor. And that the homes of the working man may keep pace with the advances in other phases of industrial efficiency.

As a matter of fact, inasmuch as labor is so vital to production, labor, organized as it is, is going to be in position to demand more and more what it wants, so without question it will find a way to obtain that domestic content and comfort which it deserves.

Business for the Contractor in Industrial Housing Operations

Some Suggestions on How You Can Get Your Share of This Work

By R. F. Duysters

When mentioning the possibilities in industrial housing to some builders they belittle the apparent opportunities for them in this line and seem to think that this business is all sewed up by large contractors and that the small fellows have no chance at all to get in on it.

These men in their determination to back up their theory that business is dead remind me of the story of the inebriated gentleman who when returning home in the wee small hours of the morning and being questioned by his fond spouse as to his whereabouts the night before, replied that he had been visiting the Browns. "Impossible," replied friend wife, "the Browns were here last night."

"I don't care," was the answer, "that's my story and I'm going to stick to it."

Really it is surprising how many people take this attitude right now. "Business is dull and that's all there is to it" is their attitude and as far as opportunity knocking at their door is concerned—zowie: half of 'em haven't any door.

But to get down to brass tacks; if you've got the equipment and some capital and you are not looking into this industrial housing situation you're overlooking the best bet of the season. A large steel plant in Wisconsin recently built 7 small houses and the contract went to the local contractor. In a small town in Indiana a concern is building on an average of 10 or 12 houses a year and the work is all being handled by a local man. These represent but two of many instances which could be mentioned of local contractors and builders getting some of the industrial work that is being done.

The writer recently completed an investigation among the various Chambers of Commerce in the United States, the results of which were most interesting. There were few which did not admit the lack of proper housing facilities and practically all had been making investigations to see just how their particular city was fixed in the way of accommodating transients as well as permanent residents.

There may not be anything new under the sun, but for Heaven's sake let us crawl out from under it and look around.

In reading over these replies one of the things that stood out prominently was the mention by the Secretary of the ease with which capital could be raised for industrial building. In many cases a combination was formed over night and work was almost under way the next day. How many of these letters mentioned the fact that their local contractor had the matter in hand and was making investigations? Not one!

Some did mention the fact that they had an architect who was taking care of the matter but not one mentioned their local contractor or builder. Is this due to procrastination on the part of builders or are they simply overlooking an opportunity to get business by clouding their vision with the idea that there "ain't no sich animal?"

The writer doesn't mean to infer that in every town, village, or hamlet there is a vast opportunity for builders to get business. Nor does he wish to convey the impression that he has overlooked the present material and labor situation. On the contrary, these things are being kept constantly in mind

For instance, if you will take the trouble to inquire you will find that labor turnover is now and has been a great problem with industrial enterprises. Right now of course more attention has been given this subject than ever before but even now there are probably plants near you which haven't given a thought as to how or where their employees live and yet are wondering why they don't hold more of their men. The reason is obvious. They are housing their men in dirty, smoke blacked tenements where there is no sense of home feeling. As a result it is an easy matter for other concerns to lure the men away with promises, some of which are kept, many of which are not.

There isn't any need to wait for the situation to become acute. Go, now, to the heads of these concerns with a definite building plan. Explain its advantages. Show how one or two family small frame houses will do much toward making for contentment and how these houses can be made to pay for themselves in a short time. You can do it. Others have done it successfully. You'll find that the man with ideas to make or save money is always welcome everywhere. The advertising man or agent often studies the plant and workings of the organization he is trying to land as a client for weeks and then artists and copy writers are put to work to draw up plans, sketches and ideas. All this costs money and may not be accepted when complete but it is part of the business and this chance has to be taken.

Therefore, Mr. Builder, get into this industrial housing situation. Read up on it and when you're all loaded and primed go out for your share. This isn't the time to sit back and bewail fate. This is the time to work harder than ever. And just a word about help. We know a contractor who is as busy as a bee and has 14 men working for him. They are all over the draft age, all married and settled in his town so neither the sound of the hammer in the ship yards nor news of the extra high wages paid there have reached them and they are content to stay where they are and disregard outside inducements.

Industrial housing operations are essential. If other business is quiet, investigate the possibilities in industrial housing work for you. Don't overlook the opportunities in this field.

However, each man has his own individual problems to solve, and the question of obtaining materials and men assumes a different aspect in every state. Industrial housing developments must go on regardless of who does the actual work, as this work is necessary and ways and means of accomplishing it must and will be found. This idea of going after industrial housing work may lead to other ideas and other business may develop from your efforts to start something. This doctrine of going after business is being consistently preached to the retail lumber and supply dealers, and they are not going to be slow in realizing the possibilities in this direction.

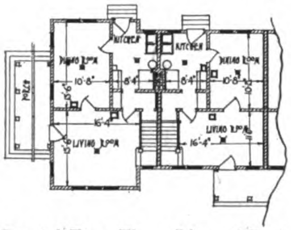
When we say industrial housing we do not mean to include residences only. If the housing facilities are properly taken care of there still remains recreation buildings, gymnasiums, swimming pools, summer houses, bowling alleys, pool rooms, etc. Experts in their line are being hired by large corporations to provide proper entertainment for their employees. In some instances theaters are erected and performances given for employees only. Out-door and enclosed moving picture places are being constructed and the benches are made at the same time. Dancing pavilions are being constructed and in some cases entire amusement parks.

In other words, industrial housing is opening the way to many more avenues of activity. Progressive and far-sighted builders and contractors are following developments and watching their opportunities. The saying, "I'll try anything once," isn't so bad at that; why not? Experience is the best of teachers and the more irons you have in the fire the better. Out of the so-called panics of years gone by have risen some of the biggest businesses of to-day; stress of circumstance has made many a man who otherwise would have disappeared in obscurity.

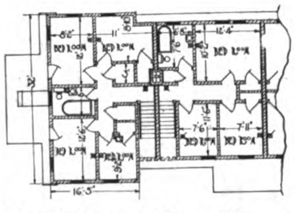
Supplement Showing the Best Homes Planned for Recent Industrial Housing Operations

¶ The Houses Illustrated Are Types of Practical Value to the Contractor. They Will Be of Assistance in Meeting Any Housing Problems That May Arise in Your Locality.

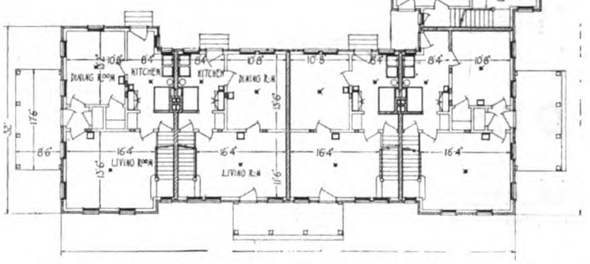
A Row of Seventeen Attached Dwellings of Six Rooms Each, the End Houses Each Having Seven Rooms, Now Being Built for the General Chemical Company, at Claymont, Del. H. Errol Coffin, Architect.

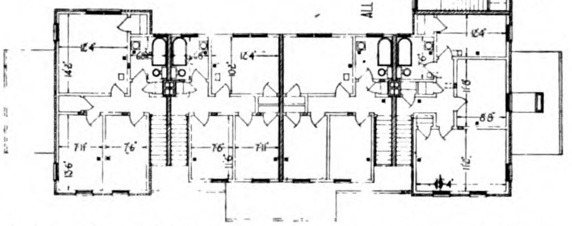


Partial First Floor Plan of End and Middle Houses in the Row of Seventeen Attached Homes.

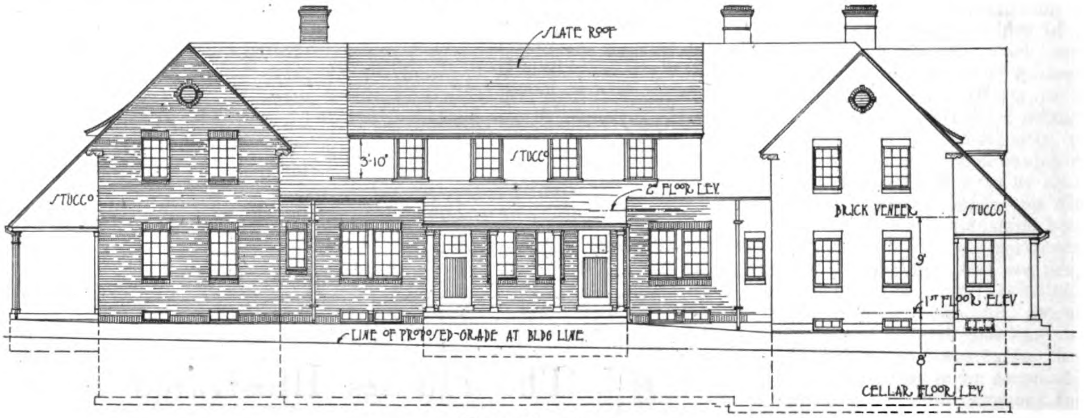


Partial Second Floor Plan of End and Middle Houses in the Row of Seventeen Homes.

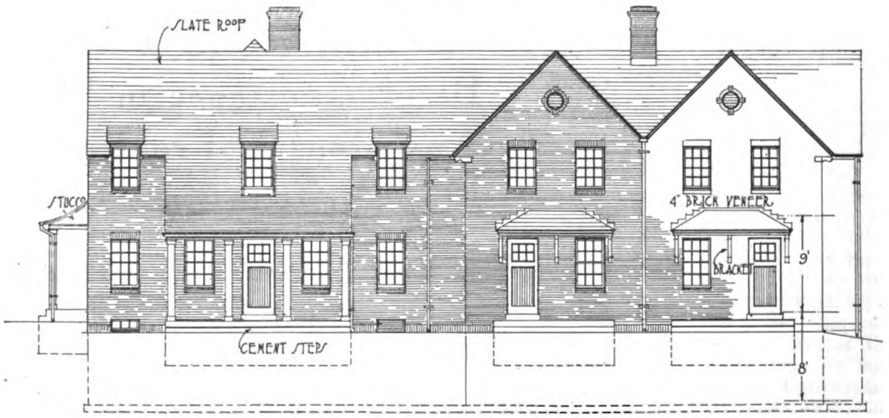




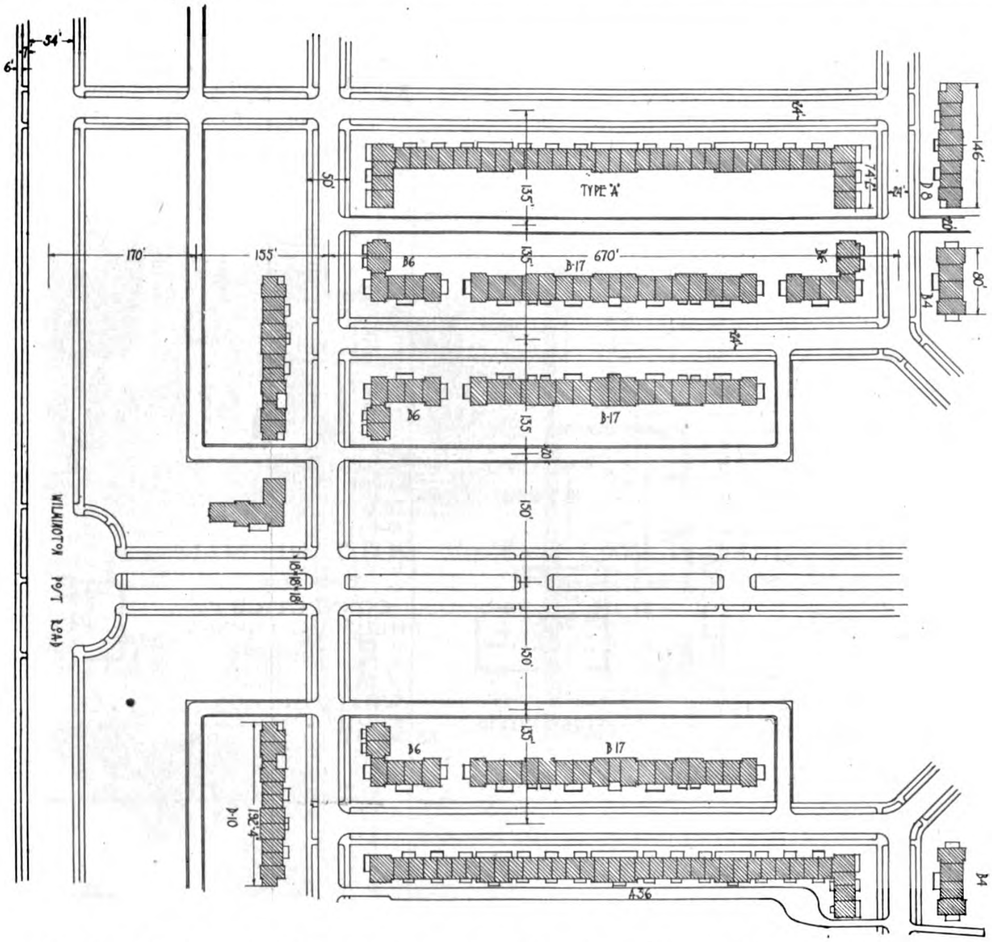
First and Second Floor Plans of Six Family House, Elevations of Which Are Shown Below. For the General Chemical Co., Claymont, Del. H. Errol Coffin, Architect.



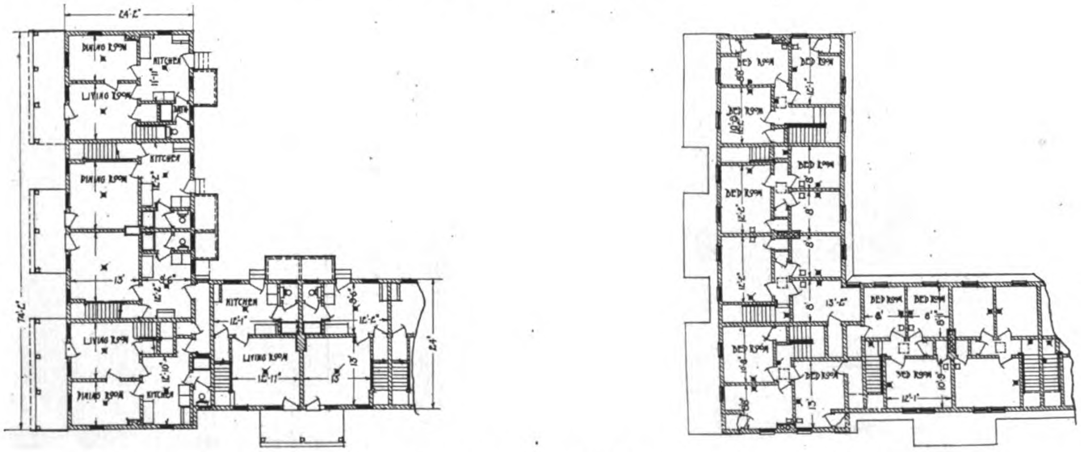
Front Elevation.



Side Elevation.

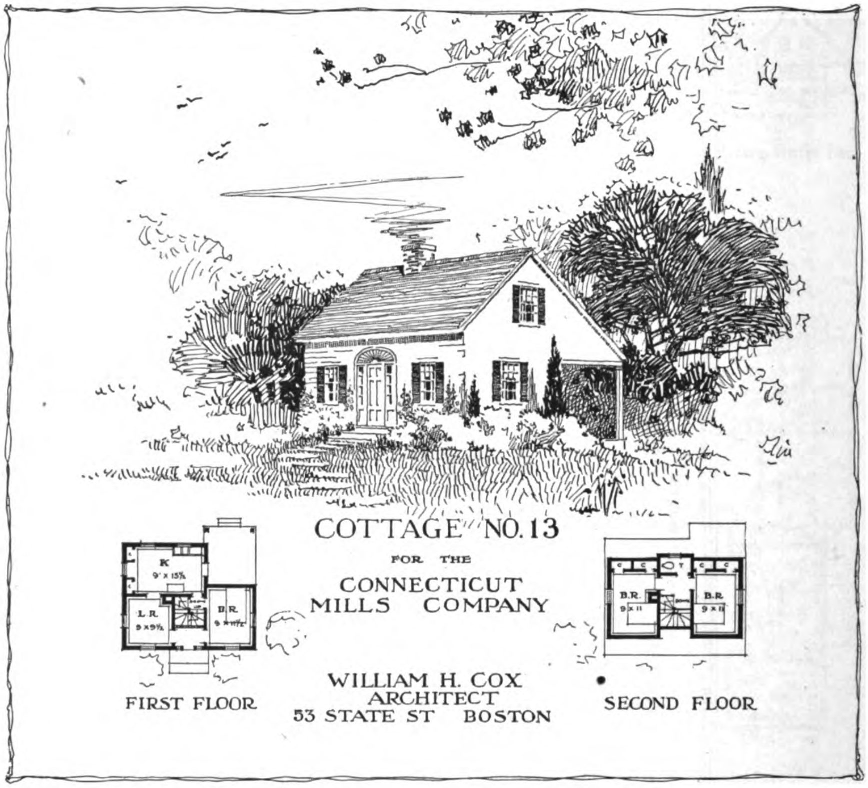


Plot Plan of Housing Development at Claymont, Del. For the General Chemical Company.
H. Errol Coffin, Architect.

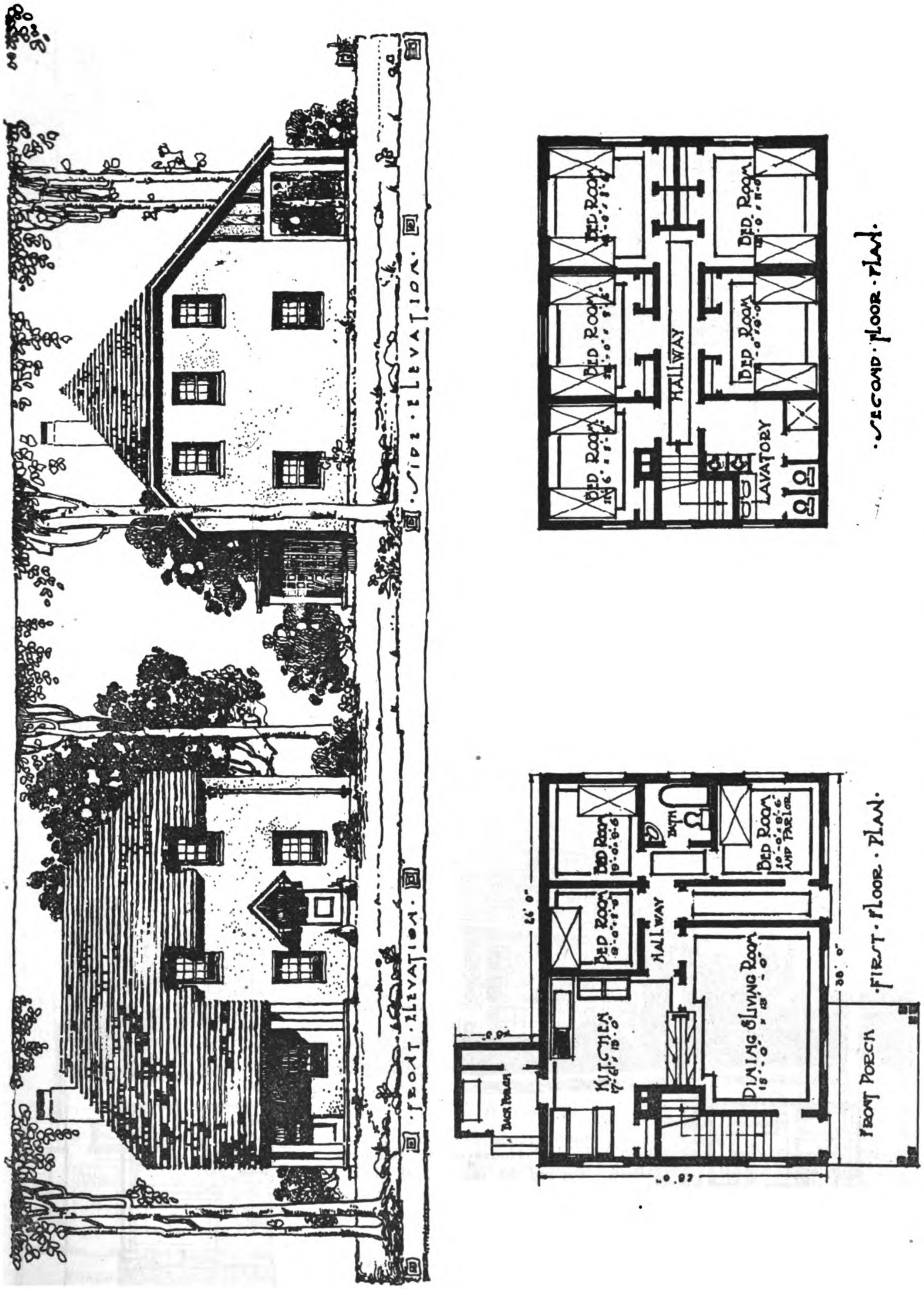


Partial First and Second Floor Plans of 36 Attached Dwellings, Shown in Elevation Below.

Half Elevation of Row of 36 Attached Dwellings Being Built at Claymont, Del., for the General Chemical Co.
H. Errol Coffin, Architect.

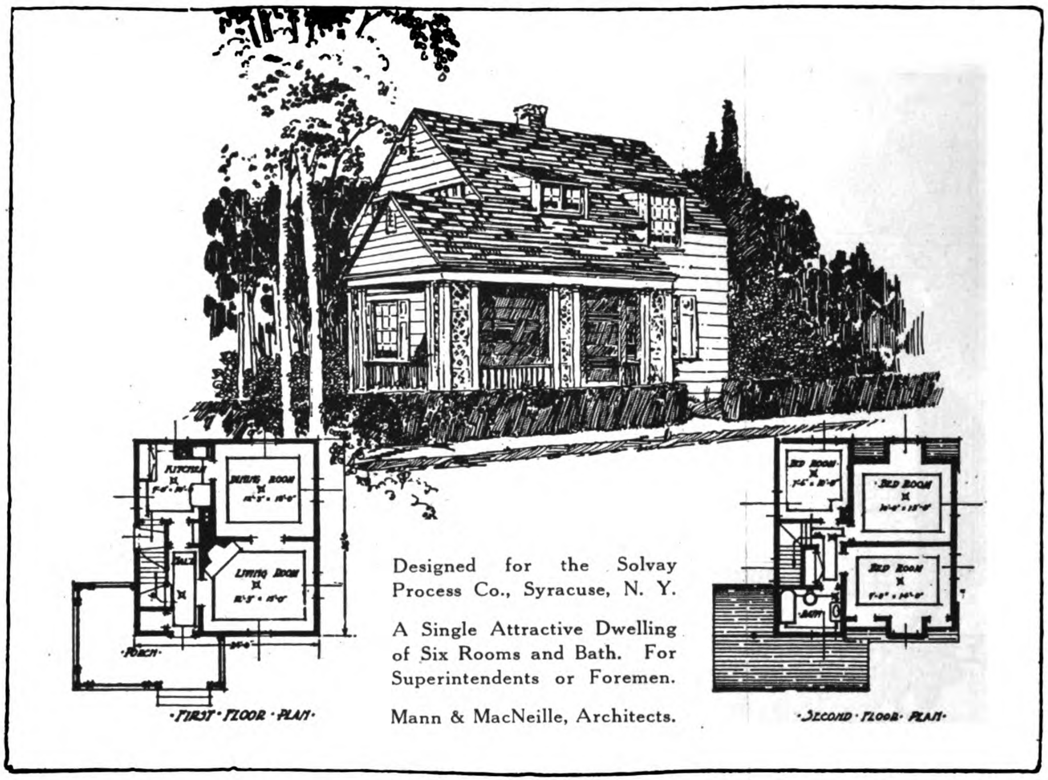

COTTAGE NO. 13
FOR THE
CONNECTICUT
MILLS COMPANY
WILLIAM H. COX
ARCHITECT
53 STATE ST BOSTON
K
9' x 13½
L.R.
9 x 9½
B.R.
B.R.
9 x 11
B.R.
9 x 11
FIRST FLOOR
SECOND FLOOR


COTTAGE NO. 10
FOR THE
CONNECTICUT
MILLS COMPANY
WILLIAM H. COX
ARCHITECT
53 STATE ST. BOSTON
K
9½ x 14
B.R.
8 x 11
L.R.
8½ x 14
B.R.
10 x 11
B.R.
10½ x 14
B.R.
11 x 15½
FIRST FLOOR
SECOND FLOOR



A Boarding House for Ten Men. On the first floor are a large dining room and kitchen, and a separate apartment for the housekeeper and family. This arrangement would be practicable for a large or small housing project, or for a single boarding house.

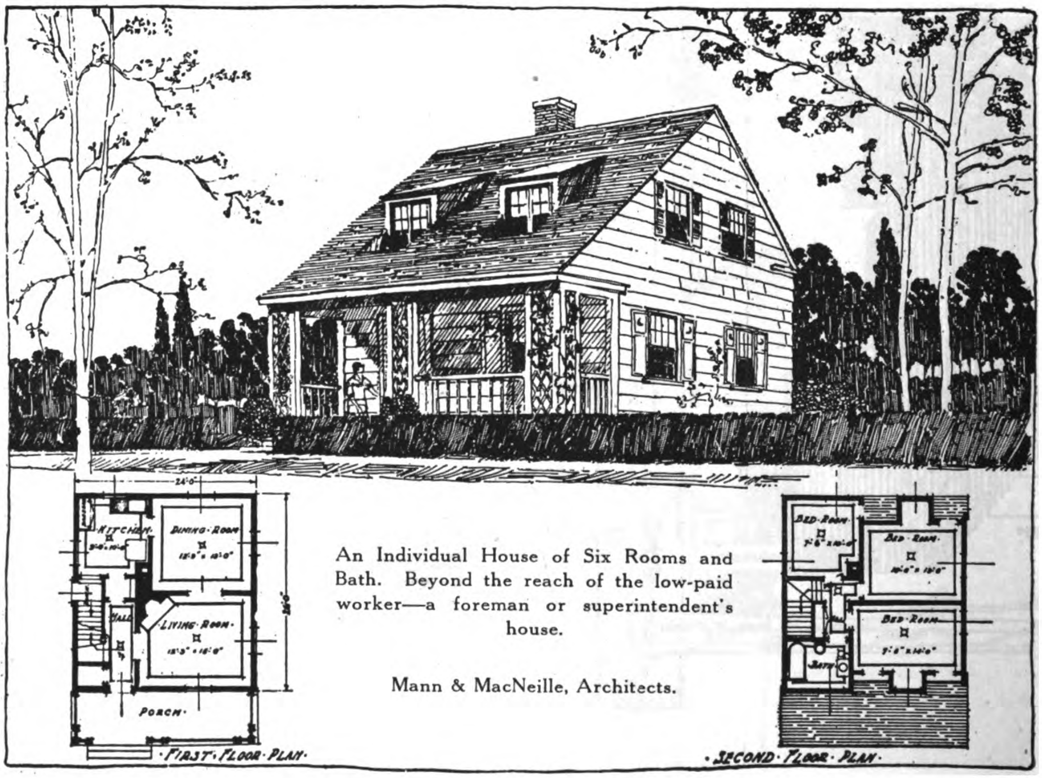
Mann & MacNeille, Architects.



Designed for the Solvay Process Co., Syracuse, N. Y.

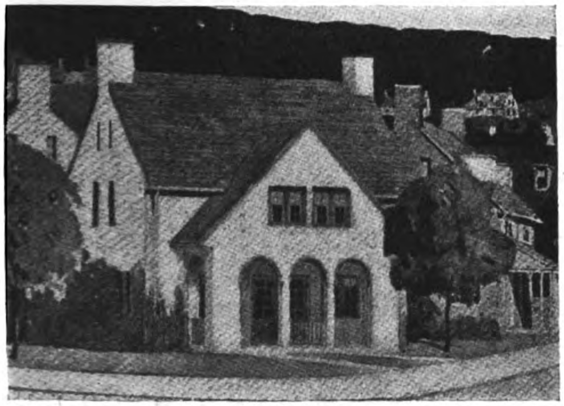
A Single Attractive Dwelling of Six Rooms and Bath. For Superintendents or Foremen.

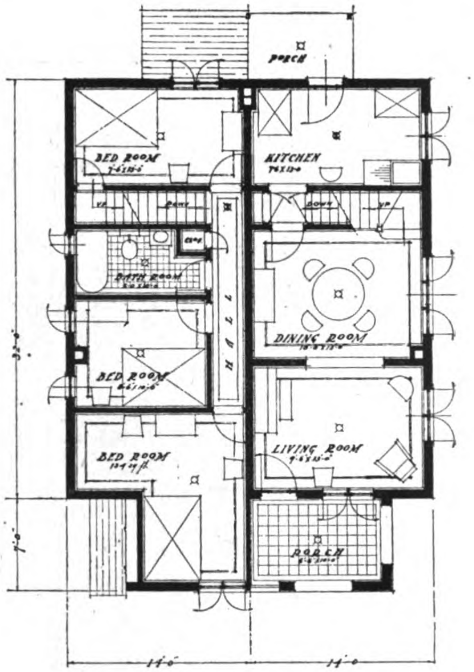
Mann & MacNeille, Architects.



An Individual House of Six Rooms and Bath. Beyond the reach of the low-paid worker—a foreman or superintendent's house.

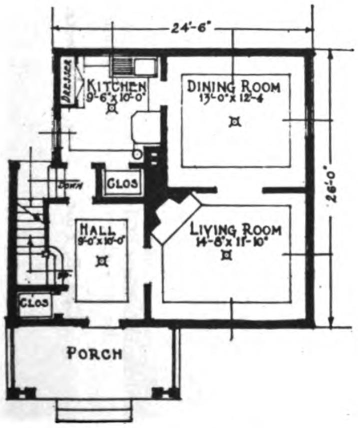
Mann & MacNeille, Architects.





A Two Family House of Very Attractive Design, Six Rooms for Each Family. The right hand side of the plan shows the first floor layout, the left hand side the second floor layout.

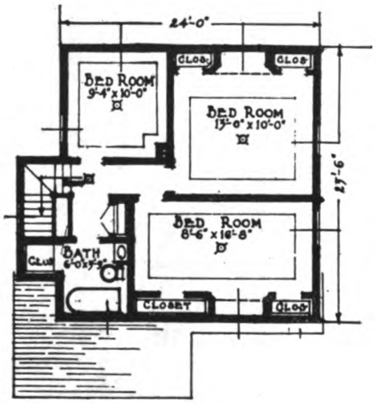
Mann & MacNeille, Architects.



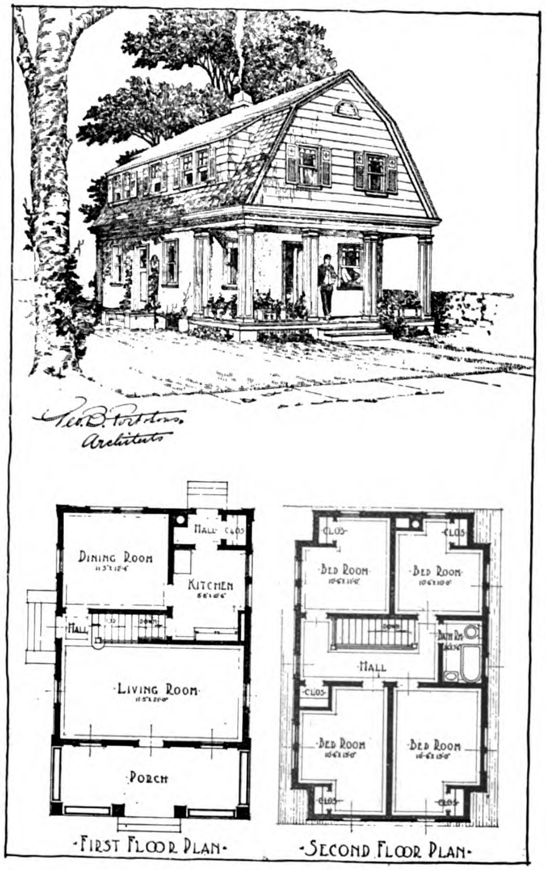
FIRST FLOOR PLAN

Seven Room House for Superintendent. A house of a homelike type, always desirable to the higher paid worker.

Mann & MacNeille, Architects.

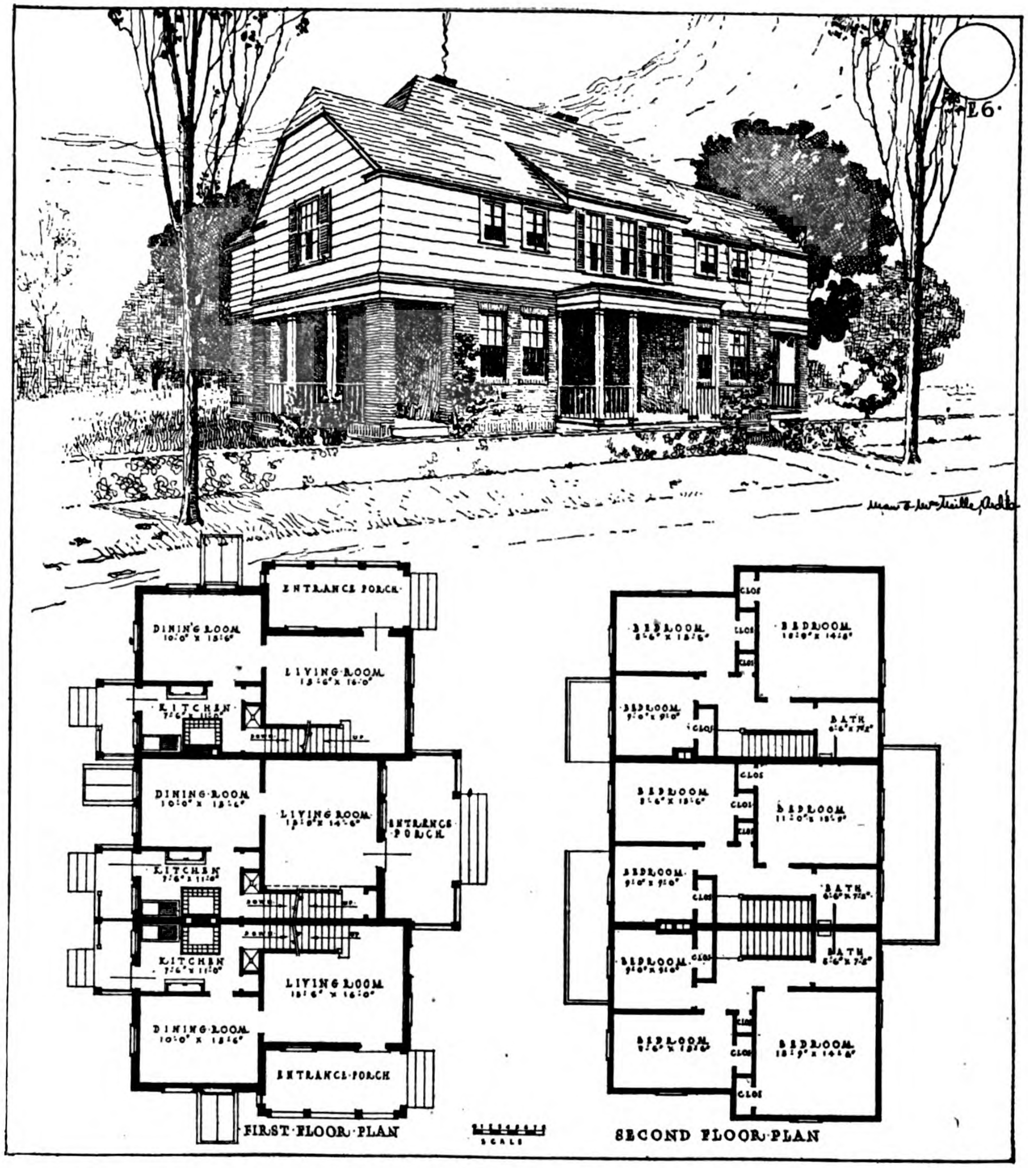


SECOND FLOOR PLAN



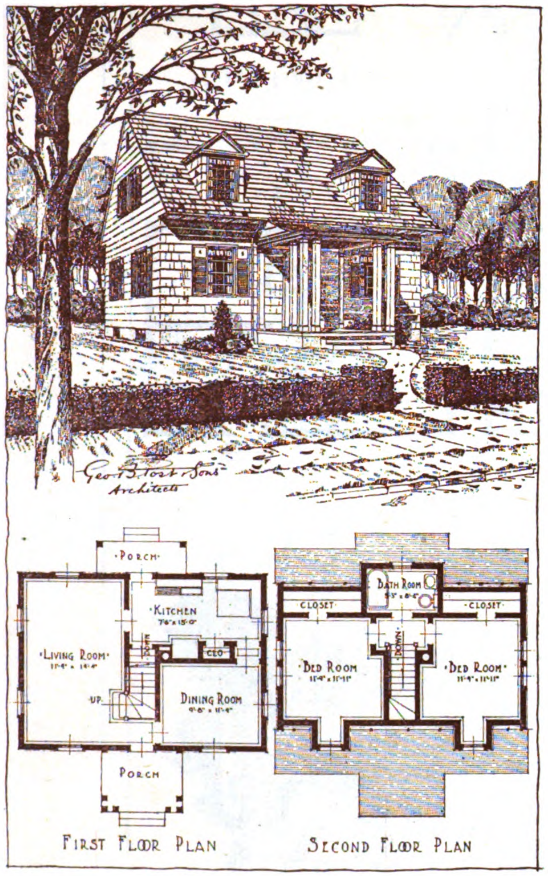
A Typical American Home of the Better Sort. This house is suitable for a narrow lot and can be well placed where space is limited.

Geo. B. Post & Sons, Architects.

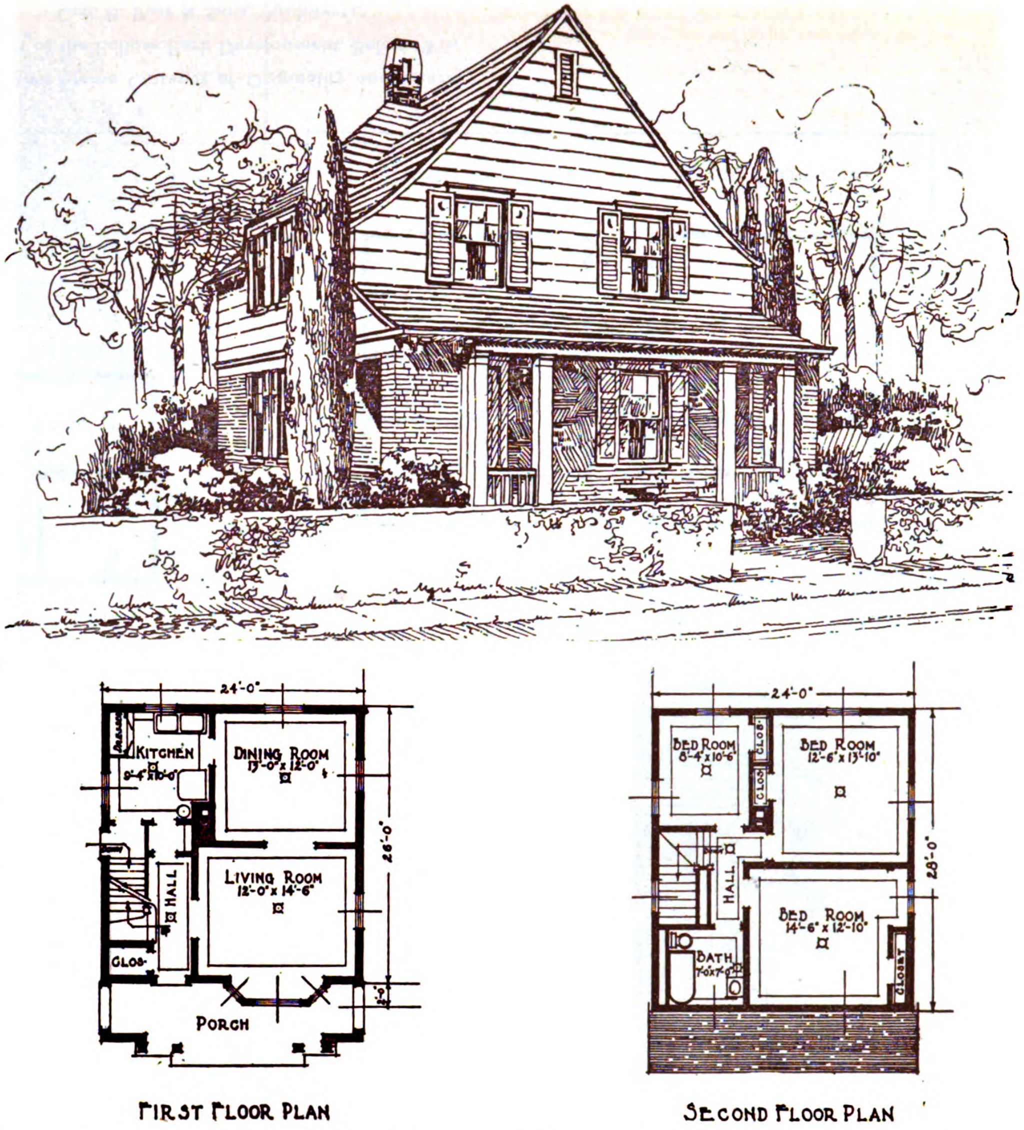


A Three Family House with Separate Entrances. Each family has six large rooms, all well lighted and ventilated. Three family houses are becoming increasingly popular

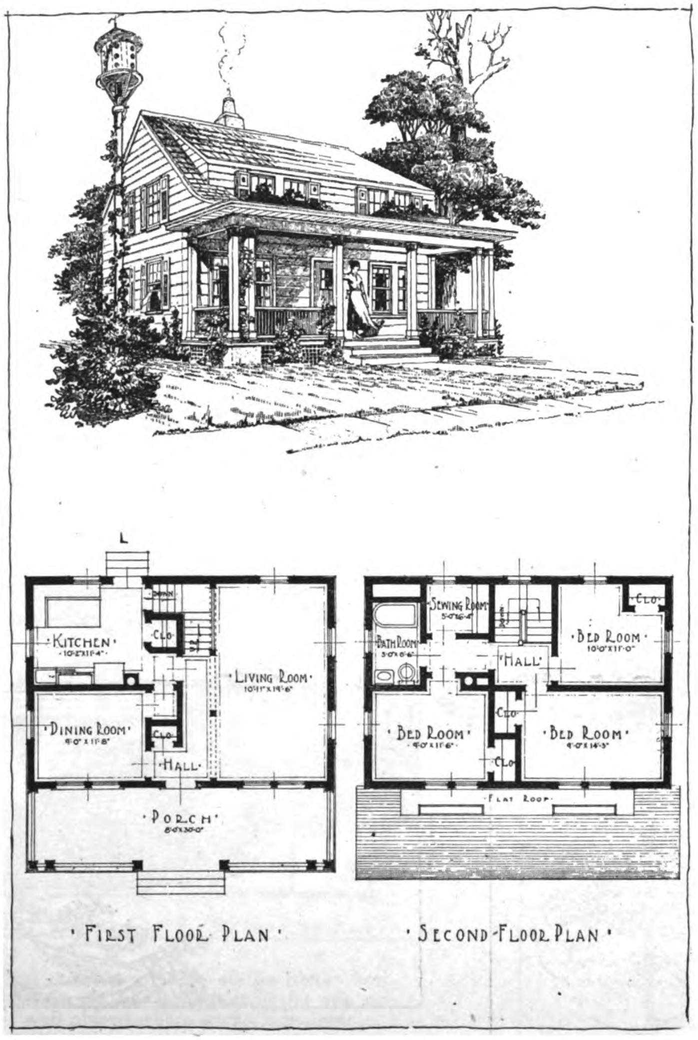
Mann & MacNeille, Architects.



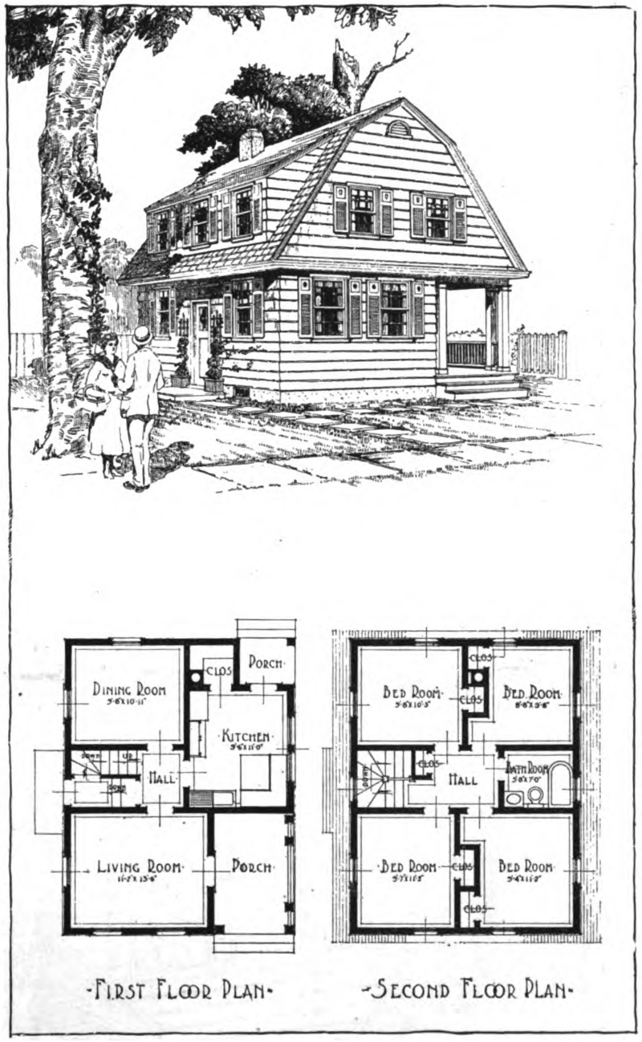
A Five Room House, Showing How Charming a Simple, Low-Cost House May Be. Geo. B. Post & Sons, Architects.



A Spacious Six Room House. There are many features here that would make this a good commercial proposition. Mann & MacNeille, Architects.

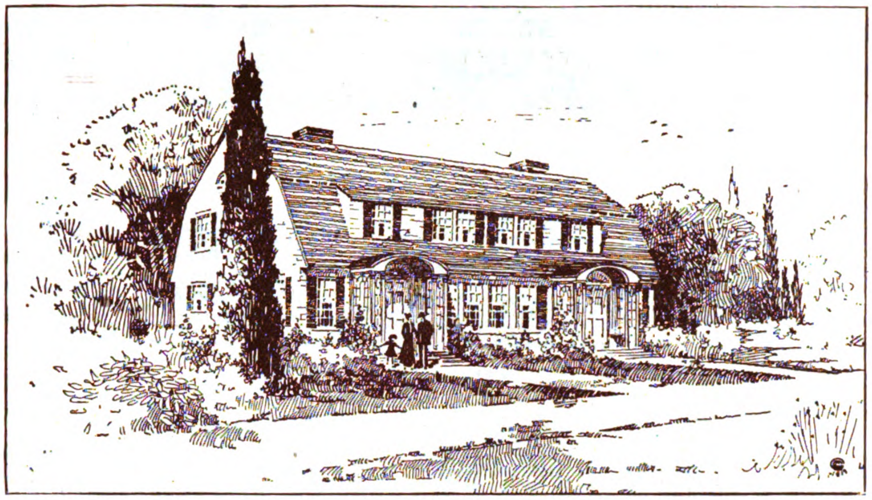


·FIRST FLOOR PLAN· ·SECOND·FLOOR PLAN·

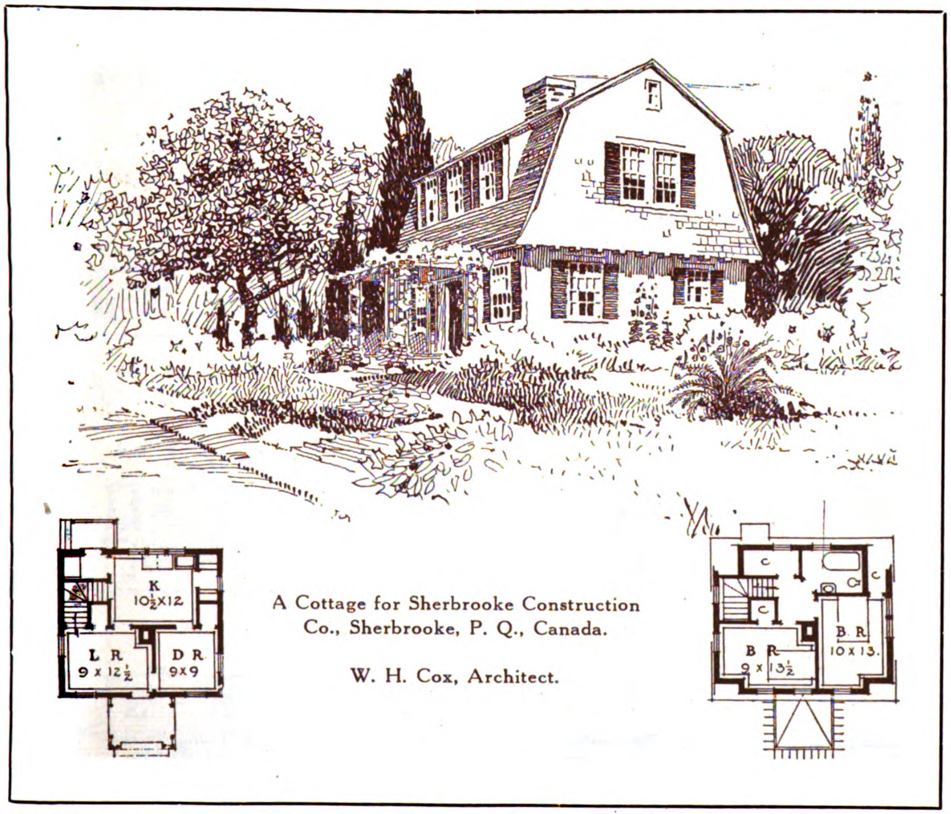


-FIRST FLOOR PLAN- -SECOND FLOOR PLAN-

Attractive Frame Cottages of Originality and Charm.
A Part of the Eclipse Park Development, Beloit, Wis.
Geo. B. Post & Sons, Architects.

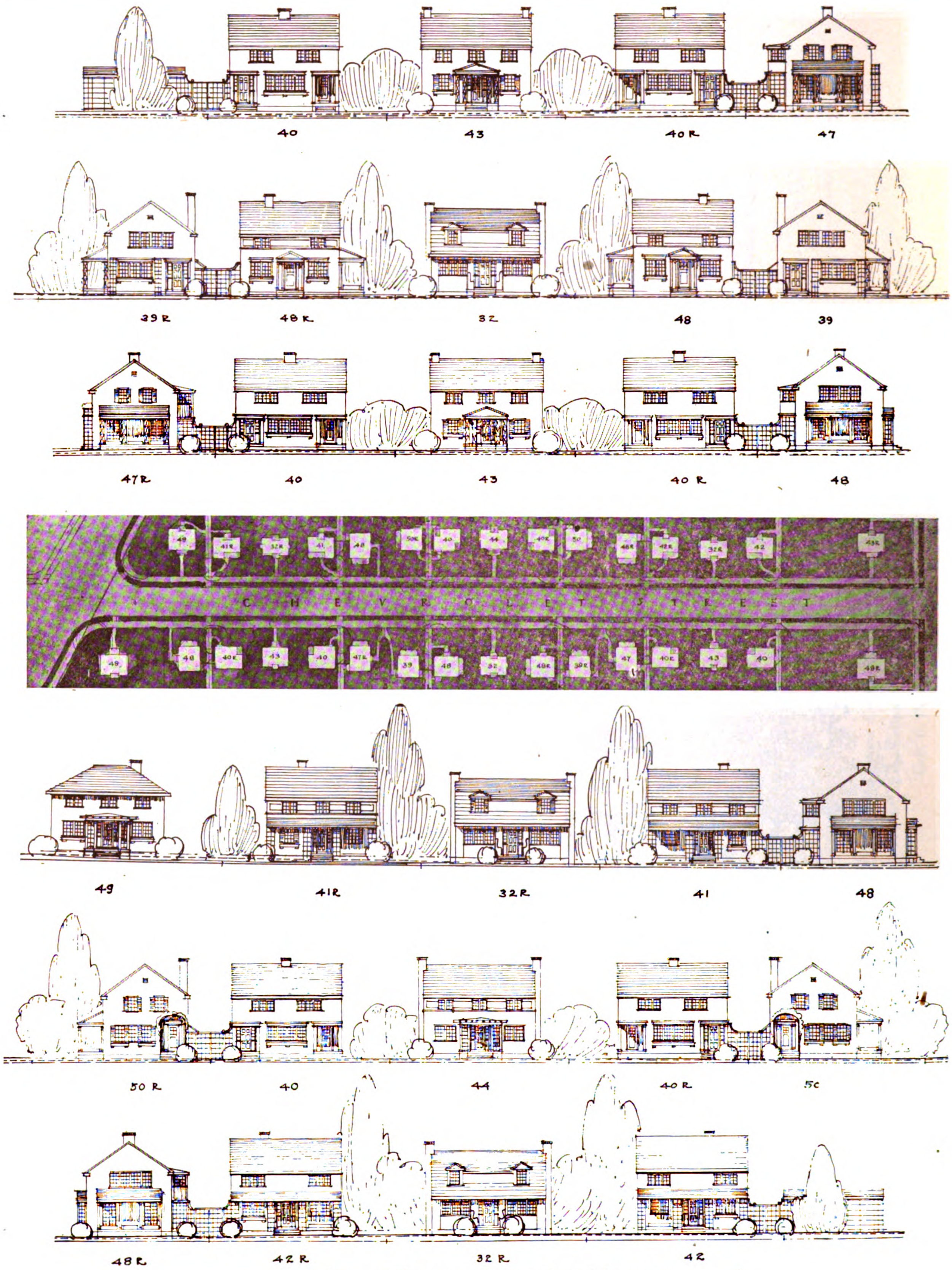


A Double House Erected for the Sherbrooke Construction Co.,
Sherbrooke, P. Q., Canada.
W. H. Cox, Architect.

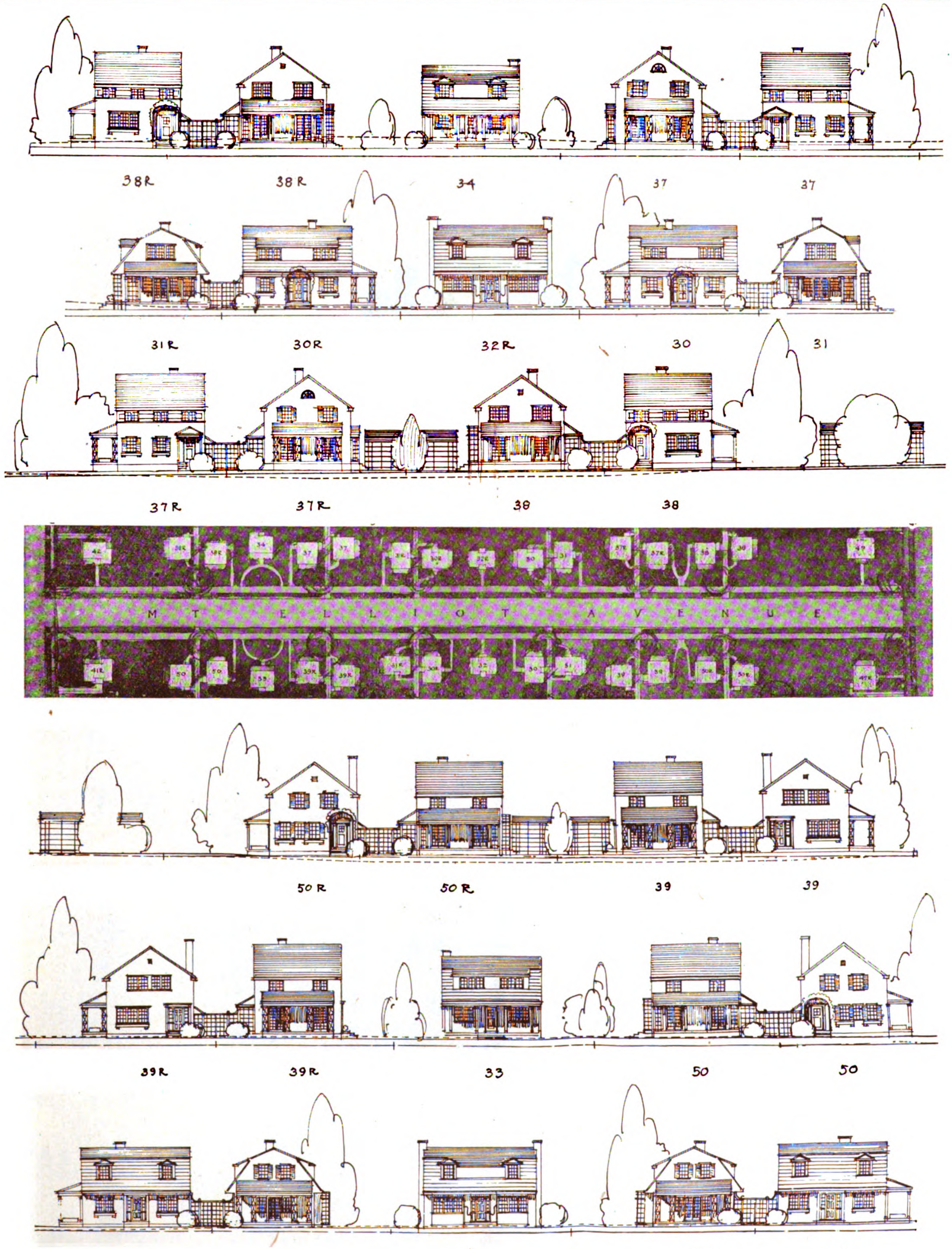


A Cottage for Sherbrooke Construction
Co., Sherbrooke, P. Q., Canada.

W. H. Cox, Architect.

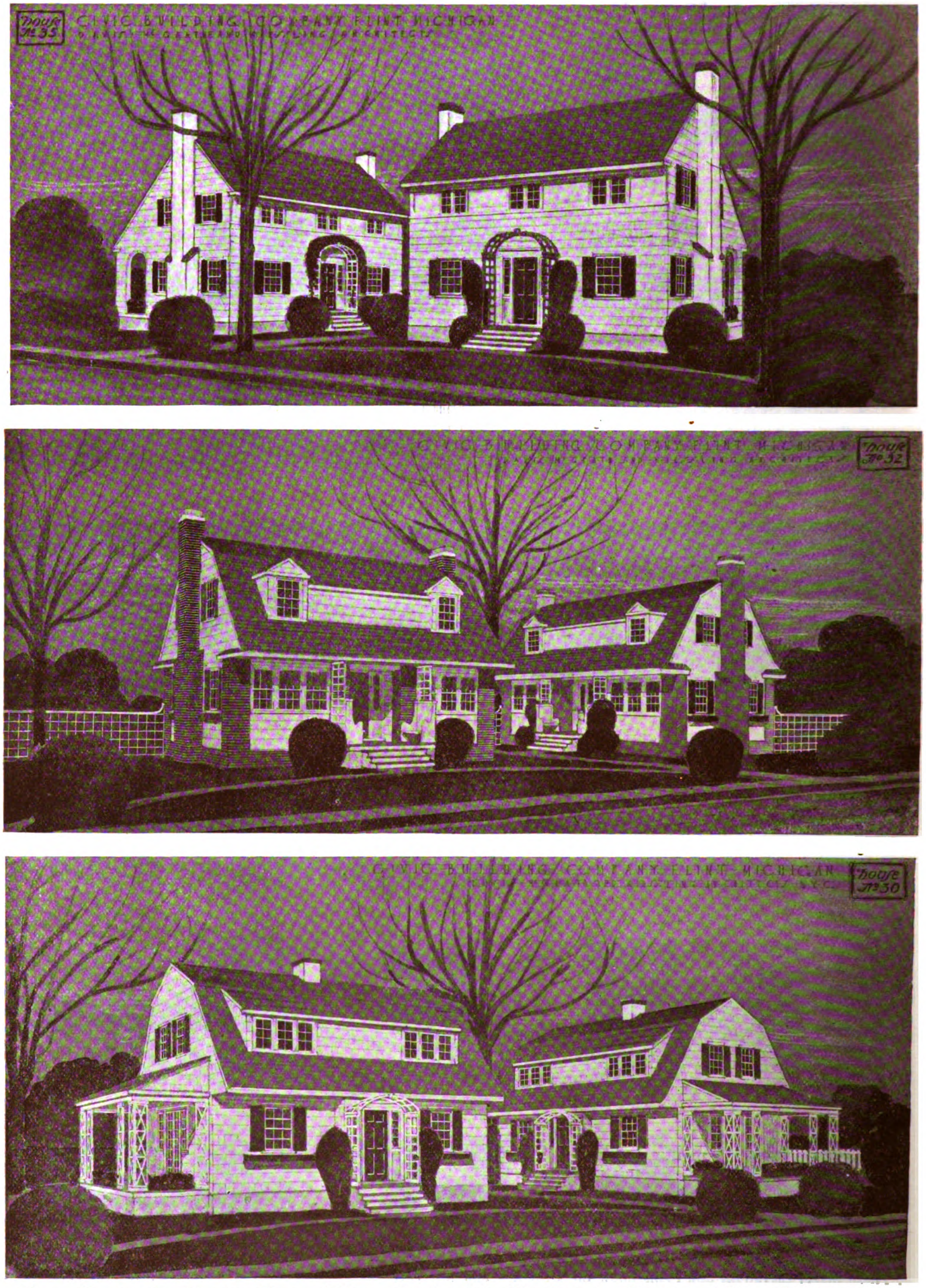


Street Plan and Elevations, Showing Typical Groupings.
An Industrial Housing Project for the Civic Building Co., Flint, Mich.
Davis, McGrath & Kiessling, Architects.

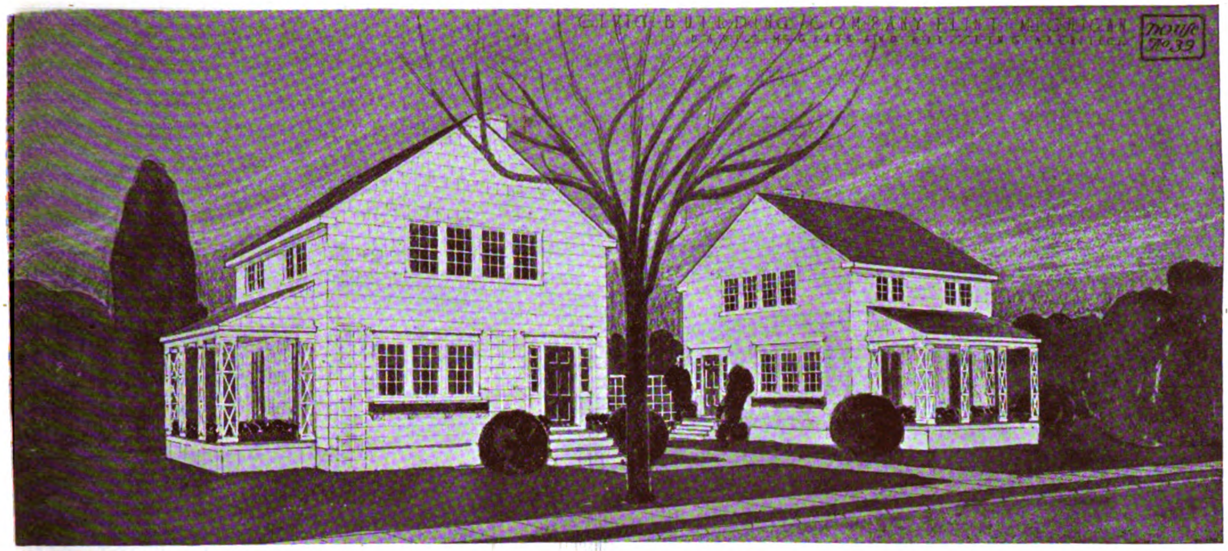


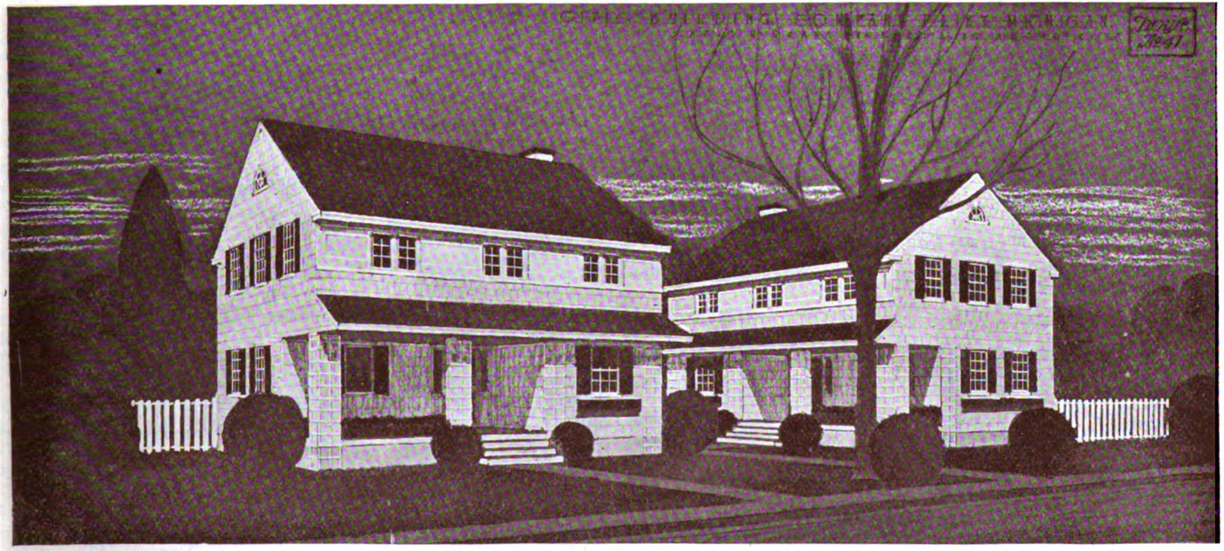
These Street Elevations and Plans Show the Grouping and the Variety in Design Which Are a Part of This Housing Scheme. For the Civic Building Co., Flint, Mich.

Davis, McGrath & Kiessling, Architects.



Views, Showing the Attractive Types of Houses Developed for This Project. Any One of Them Would Make a Desirable Home. For the Civic Building Co., Flint, Mich. Davis, McGrath & Kiessling, Architects.





Views of Houses Erected at Flint, Michigan, by the Civic Building Co.
Davis, McGrath & Kiessling, Architects.

Simple Homes Built at Flint, Michigan, for Employees in the Motor Car Industries.
Davis, McGrath & Kiessling, Architects.

Department of
MasonryConstruction
CONCRETE, BRICK, ETC.
Practical Ideas Which Will Help You Do A Quicker and Better Job

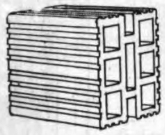


Fig. 33—A Type of Hollow Tile Block Designed Especially for Laying Up on Edge. The advantage of this is that the mortar can be more easily spread and there is afforded a better bearing surface.

How to Build and Fireproof with Hollow Tile—V

Various Types of Bearing Wall and Partition Tile Are Described, and the Reader Is Familiarized with Their Uses.

By J. J. Cosgrove

So far we have considered chiefly the standard form of hollow tile blocks commonly used for bearing walls and partitions in buildings. It will be well, therefore, to turn aside for a while to study new and special types of load bearing tile and become familiar with their use in everyday practice.

In Fig. 33 is shown in perspective a load-bearing tile which does not seem to differ much from an ordinary tile, yet it differs so in use that it would show lack of knowledge of the building art to use them in the same manner.

The chief point of difference is in the way this type of block is laid. Whereas an ordinary block is laid on end, and it is poor construction, to say the least, to lay them on side or edge—this block is designed to be laid on edge, and it would be poor construction to lay them on end, except in special cases which will later be mentioned.

An advantage of laying tile on side lies in the greater ease with which the top course can be spread with mortar to form a bed for the next course, and the better bearing surface presented. This saves both in time and in mortar and insures a firm bearing along the entire contacting surfaces. Another feature to be noted is the cross-shaped key or bond formed of cement mortar at each horizontal joint.

But all of those features would be of no avail if the shell and webs of the bearing blocks were not in compression when laid in a wall. A glance at Fig. 34 will now show that the shell and webs of this type of block are in perfect alignment when properly laid up. There is not an overlap anywhere and not a bit of the strength of the tile that is not lending its support to the wall.

It is necessary to carry only two sizes of blocks to build walls of any thinkness from 8 in. up to 80 in. with these bearing tile. These are 8-in. blocks and 4-in. blocks. Fig. 35 shows how the 4-in. blocks are used with 8-in. tile to form a 12-in. wall. By starting with a half tile 4 in. thick for one course, and 8 in. for the next, joints are broken; and by using 8-in. blocks, as shown in some of the other illustrations, the wall can be made any thickness and finished off with half tile on the opposite side wherever they are needed.

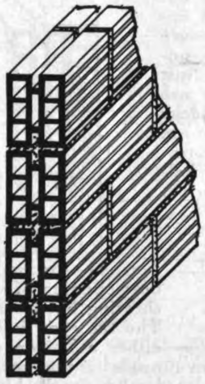


Fig. 34—This Shows Laid Up in a Wall the Tile Illustrated in Fig. 33. Note the cross-shaped key or bond formed of mortar at each joint. The shells and webs of these blocks are in perfect alignment.

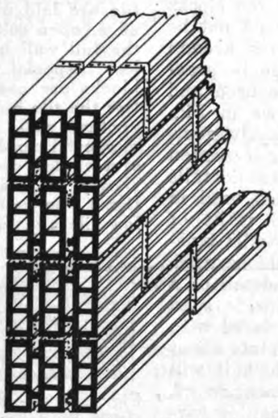


Fig. 35—Only 4″ and 8″ blocks are necessary to build any thickness of wall from 8″ to 80″. This illustration shows 4″ and 8″ tile laid up in a 12″ wall. Joints are broken, the 4″ tile course being laid alternately on each side of the wall.

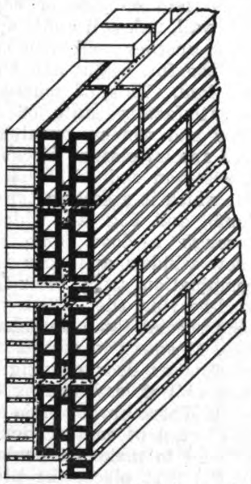


Fig. 36—Face brick can be bonded in every ninth course in connection with hollow tile, as shown.

Of course special sill tile, jamb tile, corner tile and blocks for the various purposes already described for ordinary hollow tile are provided with this type. It will not be necessary to describe them here, however, for they differ only in detail from those already illustrated and described, and they will be recognized in the details that will be shown.

With the standard size of tile of this make, face brick, when used, can be bonded every ninth course. This is well shown in Fig. 36. In order to make the bond, however, a hollow brick must be used as a filler. This provides a hollow tile or an air cell along the entire inner surface of the wall, and the thicker the wall the greater the depth of cells between the inner and the outer surfaces.

It might be well to mention in passing

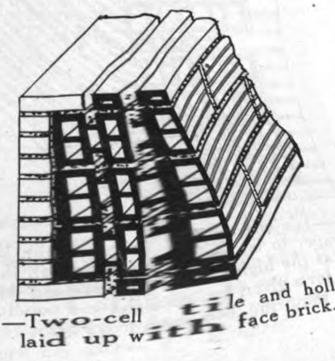


Fig. 37—Two-cell tile and hollow brick laid up with face brick.

that load bearing tile of this type are made two cells in height as well as three, as shown in the illustration. When a wall with brick facings is being laid up in ninth-course headers and two cell blocks are used, three tiers are necessary to make up the height that is made up with two tiers of three-cell tile. As it takes just about as long to lay a row of two-cell tile as it does three-cell tile, it will be seen that it is more economical to use the three-cell tile when possible. The saving in time laying a thick wall would be fully one-fourth over the time required to lay up a similar height and thickness with the two-cell tile. One-cell bearing tile are likewise made. For comparison the two-cell and one-cell are shown in Figs. 37 and 38. They are shown, too, laid up in thicker walls in order to illustrate the method of bonding used with load-bearing tile. By using different combinations of the three sizes of tile shown brick facings can be bonded every 5, 6, 7, 8 or 9 courses.

It is a characteristic of hollow tile that when laid on side or edge the end of the wall, unless it abuts against or intersects another wall, will show open cells for the full height and width the blocks are laid. This, of course, would not be a satisfactory state of affairs around door and window openings, so in practice special closure blocks are used and are set on end. This is shown in Fig. 39, which is a section through a window jamb, and Fig. 40, which is a section through a door jamb. These details show window and door frames used in combination with brick-faced walls of load-bearing tile. With tile walls stuccoed special jamb blocks would be used. Fig. 41 shows in section the detail of a window or door opening of wide span in a wall of load-bearing tile faced with brick. There are a couple of points about this detail of construction which it will be well to make particular mention of. In the first place, the tile span is carried on a T iron or two angle irons set back to back. When this form of reinforcement is used the up-turned edges of the iron support fit in the groove of the tile, so that the bearing shells and webs come one above another, thus being under compression. Instead of using T irons or angle irons, the blocks forming the window head may be reinforced with steel rods bedded in concrete as for other forms of hollow tile; keyed arch tile, either flat or curved, may be used.

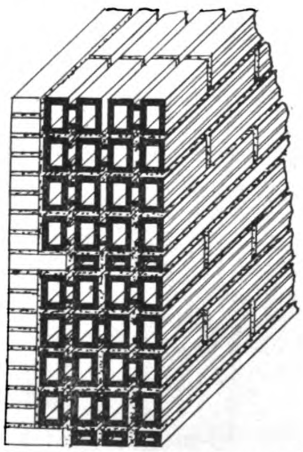


Fig. 38—Tile one cell high can be used. It is cheaper to lay a wall with the three cell tile, as the higher tile need less labor in setting for a given height of wall, besides requiring less mortar.

It might be well to answer here some questions which have been raised on the subject. The question has been asked whether when flat arch tile are used it is necessary to reinforce them, and what is the simplest and easiest way in practice to reinforce window caps or lintels.

To clear up the doubt about flat arch tile, it is only necessary to say that no form of arch needs reinforcement if properly proportioned and built. Flat window caps are no exception to this rule, so when keyed caps are used it is not necessary to reinforce them. Like all arches, however, they should have abutments of suitable strength and weight against which to rest.

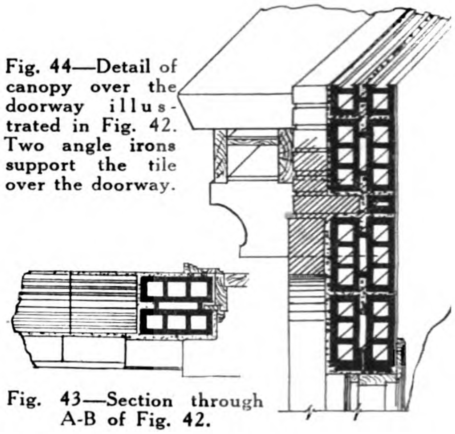


Fig. 44—Detail of canopy over the doorway illustrated in Fig. 42. Two angle irons support the tile over the doorway.

Fig. 43—Section through A-B of Fig. 42.

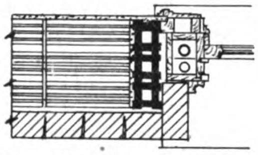


Fig. 39—When hollow tile are laid on side or edge, open cells are left the full wall height unless special closure blocks are used or unless the tile butt against another wall. The use of special closure blocks at a window opening are shown in this illustration. The wall is of hollow tile and face brick.

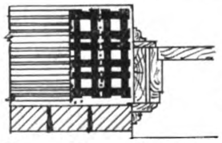


Fig. 40 — Section through door jamb showing use of closure tile in connection with brick faced hollow tile wall.

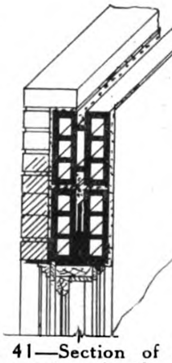


Fig. 41—Section of window opening of wide span, showing head construction. The tile span is carried on either a T iron or on two angle irons set back to back. Or the blocks forming the head may be reinforced with steel rods embedded in concrete. Keyed arch tile may also be used.

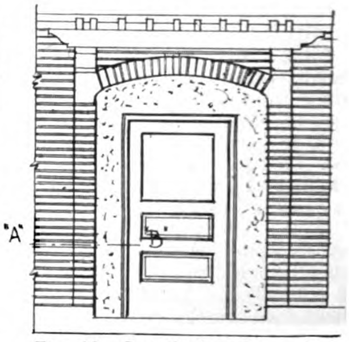


Fig. 42—Detail of entrance doorway in hollow tile cottage faced with brick. A detail through the wall at "A-B" is shown in Fig. 43.

The simplest way to reinforce window and door caps in practice is to build them and allow them to set before using. Cut the steel reinforcing rods the right length, then set upright on the floor one of the end blocks of the cap. Place in this the reinforcing rods, seeing to it that they are properly spaced and aligned, then fill the cells of the tile with concrete. Place a second block on top, fill it with concrete, and continue until the right length of cap is made. Some masons find it easier to set up the tile on planks set at an angle of from 20 to 45 degs.

Returning to our detail of window heads, it will be noticed that the brick arch is not sprung across the opening to carry the face brick. On the contrary the horizontal courses of brick are continued across the opening. This makes a very pleasing window or door finish, but necessitates some way of supporting the brickwork. In this case, as shown by the detail, an angle iron is used for the purpose, and the window stop of the frame is allowed to extend up between the reinforcement supporting the tile blocks and the angle iron supporting the brick as a stop-draft.

In Fig. 42 is shown the detail of an entrance doorway in a hollow-tile cottage faced with brick, in which a pleasing combination of stucco finish and brick veneer is used. The brickwork around the opening terminates with a brick pilaster and arch, and from the inner edges of the pilasters to the door jamb the wall is stuccoed. Fig. 43, a detail through the wall at A-B, shows how the stucco is returned around the corner. Another use for the groove in load-bearing tile will be seen in the way a stop is built into the groove. This not only anchors the door jamb in place, but effectually prevents leakage of air or cold around the door frame.

Detail showing the canopy over the doorway may be seen in Fig. 44. Here we have two angle irons supporting the tile over the doorway, but the brickwork being arched there is no need for iron

or steel support, so none is shown.

Load-bearing tile are burned hard, standard and medium. Standard-burned tile should be used in walls to be veneered with brick, cemented or stuccoed. Standard-burned tile has just about the right degree of absorption to retain the proper amount of moisture to form a perfect bond and keep mortar, cement or stucco from creeping. In working upon the surface of standard-burned tile wetting down is unnecessary.

Hard-burned tile has very low moisture absorption and should be used for exposed surfaces where no veneering is to be applied; such as silos, stacks, unfinished outer walls of buildings, or any unprotected exterior wall.

Medium-burned tile should be used where a semi-porous tile is commonly used for interior work only.

The following tables and rules will be found useful in practice for determining the safe weights for walls of different heights and thickness built of load-bearing tile. Cut them out and paste in a convenient place for ready reference.

Carrying capacity, in pounds, of different heights of various thickness Load-Bearing Tile walls, per lineal foot, including weight of tile and mortar; based on tile complying with specifications following and using safety factor of 10 or 60 pounds per square inch.
Data based on authentic engineering tests.

Actual Thickness Wall	HEIGHT OF WALL								Weight per Square Foot
	15′—0″	14′—0″	13′—0″	12′—0″	11′—0″	10′—0″	9′—0″	8′—0″	
8¼″	5,340	5,380	5,420	5,460	5,500	5,540	5,580	5,620	40 lbs.
13″	8,460	8,520	8,580	8,640	8,700	8,760	8,820	8,880	60 lbs.
17¾″	11,580	11,660	11,740	11,820	11,900	11,980	12,060	12,140	80 lbs.
22½″	14,700	14,800	14,900	15,000	15,100	15,200	15,300	15,400	100 lbs.
27¼″	17,820	17,940	18,060	18,180	18,200	18,320	18,440	18,560	120 lbs.

Rule 1—Wall thickness in dwelling, office and apartment buildings may be 4 in. less.

HEIGHTS AND THICKNESSES OF WALLS

MAXIMUM HEIGHTS FOR WALLS		MINIMUM THICKNESS FOR WALLS	
Stories	Wall Height	All-Tile	Brick-Faced
1st story	18′—0″	27¼″	26¾″
2nd story	15′—0″	22½″	22″
3rd story	13′—6″	17¾″	17¼″
4th story	12′—0″	17¾″	17¼″
5th story	12′—0″	13″	12½″
2-story Dwellings	22′—0″	8¼″	12½″

Rule 2—Where floor spans exceed 25 ft. 0 in. wall thickness shall be increased.

Rule 3—Where length exceeds 125 ft. 0 in. increase thickness 4¾ in. for each 25 ft. 0 in. additional.

Rule 4—Openings exceeding 33⅓ per cent of wall area require increased wall thickness.

Rule 5—Interior bearing walls bonding into other walls may be diminished 4¾ in.—minimum 8¼ in.

Rule 6—The use of metal ties, or bonding with headers further apart than every fifth course of brick veneering, shall not be considered in determining bearing area.

(*To be continued*)

Protecting Newly Placed Concrete From Extreme Heat or Extreme Cold

By H. C.

All newly placed concrete work must be protected against the elements and against injury from other outside causes until the concrete has thoroughly hardened. In most cases this protection need be no other than a covering of some sort which will prevent rain from falling directly on the exposed concrete surface.

In certain climates, and in certain seasons of most all climates, especial precautions must be taken to protect the concrete against freezing temperatures. There are various ways of doing this. The most effective and also the most usual and easily accomplished is to build a sort of covering over the concrete either of boards or canvas and place under this covering small stoves or heaters which are kept burning continuously until the concrete has hardened. The heat given off by these stoves will be sufficient to prevent the concrete from freezing, even though the canvas or board covering should not be entirely air tight.

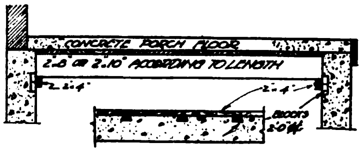
In seasons of extreme heat it is also necessary to protect the concrete against direct rays of the sun and direct exposure to the heat. Such exposure will cause the water in the concrete mixture to evaporate or dry out before the concrete has had an opportunity to harden, and thus an inferior concrete will be produced, particularly at the surface. The best way to protect the concrete against such injury is to keep it covered with water until it has hardened. In the case of pavements or floors this is easily accomplished by building little dams of clay or other suitable material across the surface of the concrete and keeping the enclosed spaces filled with water for several days, or until complete hardening has been accomplished. In other cases where this method is not practicable the concrete may be protected by keeping the air in the room in which the concrete is located saturated with moisture either by means of escaping steam or fine spray of water.

The presence of water or moisture in the atmosphere will not in any way injure the concrete either before it has hardened or after. Before hardening has set in the presence of moisture in the air is exceedingly beneficial to the complete and thorough hardening of the concrete. After the hardening has been accomplished the presence of moisture in the air will not affect it.

The application of paint or other protective coatings to concrete work before it has hardened will cause it serious injury. This injury arises from the fact that the hardening process will be materially retarded by the admixture of any substance not properly a part of the concrete mixture. The concrete at the surface will also be materially weakened by this application and in all probability will peel off after the concrete below the surface has hardened. After the hardening process has been completed no protective coatings of paint or other material are necessary.

Handy Kink in Building Concrete Porches

By M. Dugan Concrete Co.



The accompanying sketch shows a small kink we use in putting up concrete porches. When we pour the concrete for the foundation we put in wooden blocks 2 ft. apart and 11 in. from the top of wall. When we are ready to build forms for floor slab all we have to do is nail 2 x 4's to the blocks and put 2 x 10's on these to carry the floor. This does away with leveling the dirt under the porch and all shoring and bracing. We have tried this out a number of times and find it is a great time-saver when we have concrete porch work to do.—*Concrete.*

A New Development in the Unit Concrete Building

A Garage Built by This System

A Factory Built of Concrete Units Assembled on the Job

The Buildings Are Constructed of Pre-Cast Units, Assembled in Place at the Site—This Article Describes the Forms Used and Explains the Manner of Erection

By H. Colin Campbell

VARIOUS systems of concrete construction having to do principally with units in the form of slabs are not uncommon. A number of these are enjoying particular popularity at present from various causes, principally in housing developments. In fact, concrete construction is inviting unusual attention because of transportation conditions. Most of the materials of which it is made can be found very near the site of the work. Unit construction often makes possible a manufacturing plant alongside the building site, but if not then the units are very easy to transport to where they are to be finally set up.

The live contractor to-day has a motor truck to get himself, men, materials and tools to and from their work. Unit systems should therefore appeal to him.

One of the latest developments of unit concrete work is shown in accompanying sketches. These illustrate details of the unit section and various adaptations of the units to different types of structures. It will be seen that there is a possibility here for rapid permanent construction adaptable to many present demands for concrete buildings, especially those that have arisen as a result of industrial housing problems and small industrial plants. The designs shown, which are, of course, only suggestions, are thoroughly practical and illustrate the use of units which consist of thin reinforced concrete slabs having studs or joists on the side cast integral with the slabs and giving them a stiffness that permits handling without cracking or breaking.

Another feature of these units is that they are manufactured in widths varying from 16 to 32 inches and in lengths necessary to take care of one-story heights. The weights are such that two laborers can handle the smaller sizes of units in all details of manufacture, loading, unloading and placing in walls, floors, ceilings, or roofs, while four laborers can easily handle the larger sizes.

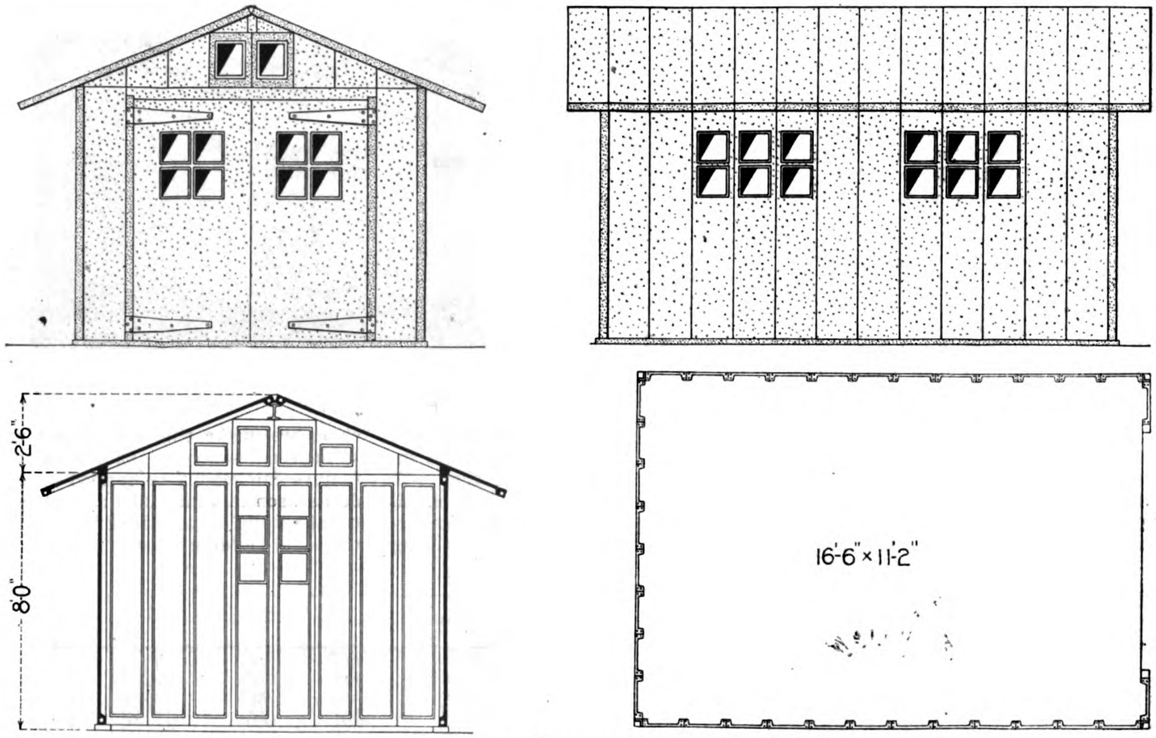
Much of the objection to concrete building units of slab form heretofore used has been their excessive weight, making handling of them impossible except with cranes or hoists. In the manufacture of units of this kind, the concrete mixture, consisting of sand, broken stone or pebbles and water is made moderately wet, although excessive water should be avoided. No more should be allowed than will permit the mixture to assume a quaky nature when vibrated for settling it thoroughly in the molds or forms.

Forms are made of steel. In the bottoms near each edge are troughs extending the length of the form for the purpose of shaping or casting the section corresponding to studs or joists. In operation these molds are placed one at a time on a table, the top of which is so arranged that it can be vibrated to settle the concrete mixture to utmost density and completely surround the reinforcing in each slab. Round rods are used, supported in proper position by having their ends bent at right angles, these ends resting on the lower corners of the edges of the mold.

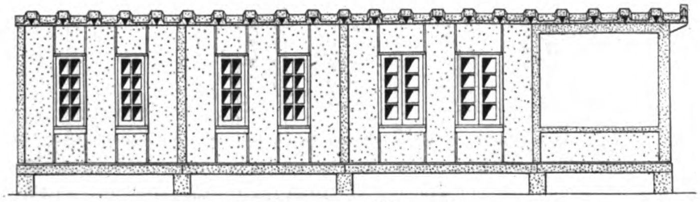
One of the best devices to use for striking off the concrete after filling the mold is a piece of 2-inch gas pipe, since this can be used also as a roller to give added compactness to the concrete and it is recognized that rolling both increases density, hence strength of the slabs, by compacting the concrete and removing excess water from it. After the molds have been filled they are slid into curing chambers that permit steam hardening of the concrete. This method of curing has the double advantage of producing a better concrete and expediting the hardening so that the finished slabs are in usable condition within ten days after manufacture. Any other process of curing would make it impossible to use them with safety until they had aged from three weeks to a month.

It requires but little imagination to see the adaptability of these units. They can be employed not only in plain walls but for foundations, roofs and floors. Hollow walls with double and single air spaces are very readily built by using them. In erecting walls intended to have double air spaces the units are stood end to end and back to back, the edges of the ribs together with long narrow sheets of waterproof paper between them. This construction gives double air spaces extending from foundation to ceiling. Additional pairs of units are placed on the foundation or wall, properly spaced from the first pair and are permanently joined to each other. As the units are placed in line to form the wall, the ends of the mild steel transverse reinforcing rods are pried out from their former position in the back corner of the edges of the unit and left so as to protrude into vertical pockets formed as they are set up. This pocket is then filled with a rich grout which closes all inside and outside joints and in hardening thoroughly bonds the ends of the reinforcing rods, thus securely holding the units in their proper position in the wall. The result is a reinforced concrete structure consisting of columns extending from the foundation to the wall.

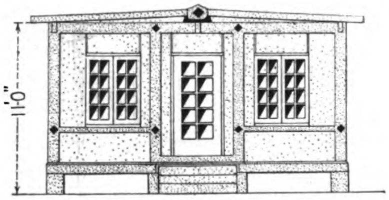
Walls with single air spaces are formed by setting the units on end and in line on the floor or foundation, then temporarily covering the vertical spaces on the back of the wall between each pair of studs with planks stood on end and held in place with oiled bolts. First, however, the ends of the transverse reinforcing rods are pried out and twisted with the ends of the rods embedded in the adjacent units, this twist being bent back into the space between the studs. This space is then filled from above with a rich grout which may be reinforced if



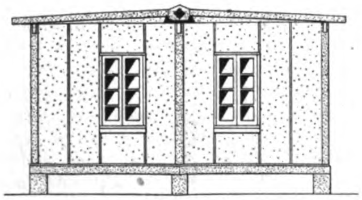
Elevations and Plan of Garage Built by the Unit System



Side Elevation of Bungalow



Front Elevation



Rear Elevation

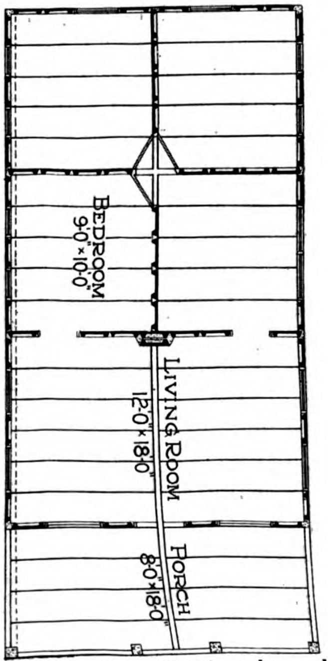
desired throughout its entire length if it seems necessary to increase the strength to give added stiffness.

The adaptability of this type of construction is great for small structures such as farm tool sheds, chicken houses, corncribs, etc. For the better class of buildings strips may be embedded on the surface of the column form against the vertical plank and lath, or wall board, or metal fabric attached and the surface thus formed finished with plaster. This construction accomplishes what concrete always attains if properly used, namely, fireproofness, and large air spaces are introduced which provide insulation, so often but poorly attained with other methods of using concrete except at considerable trouble and expense.

These units make an excellent fireproof floor. They can be laid either with the ribs up or down and their load carrying capacity can be increased within reasonable bounds as may be necessary to provide for longer spans than ordinary. Between the ribs the units can be filled with cinders to the level of the ribs and the actual floor wearing surface supplied by concrete surfacing. If laid with the ribs down so that the under side forms the ceiling, the surface can be polished with a floor machine, or top-coated with cement mortar as in two-course sidewalk or floor construction. All of the possibilities of using selected aggregates for the surface that is to be finally exposed lie within the range of possibilities of this type of unit.

Foundations are built the same as walls but to comply with strength requirements laid down by building laws, both ribs and slabs can be designed for greater thickness. It will also be seen from photographic illustrations accompanying this article that the slabs can be used in horizontal and vertical combinations.

This type of construction is not expensive. One advantage which makes for low cost is that every step in the erecting finishes a section of wall from floor line to ceiling, not just a height of a few inches as is accomplished when a course of brick or block is laid. Certain

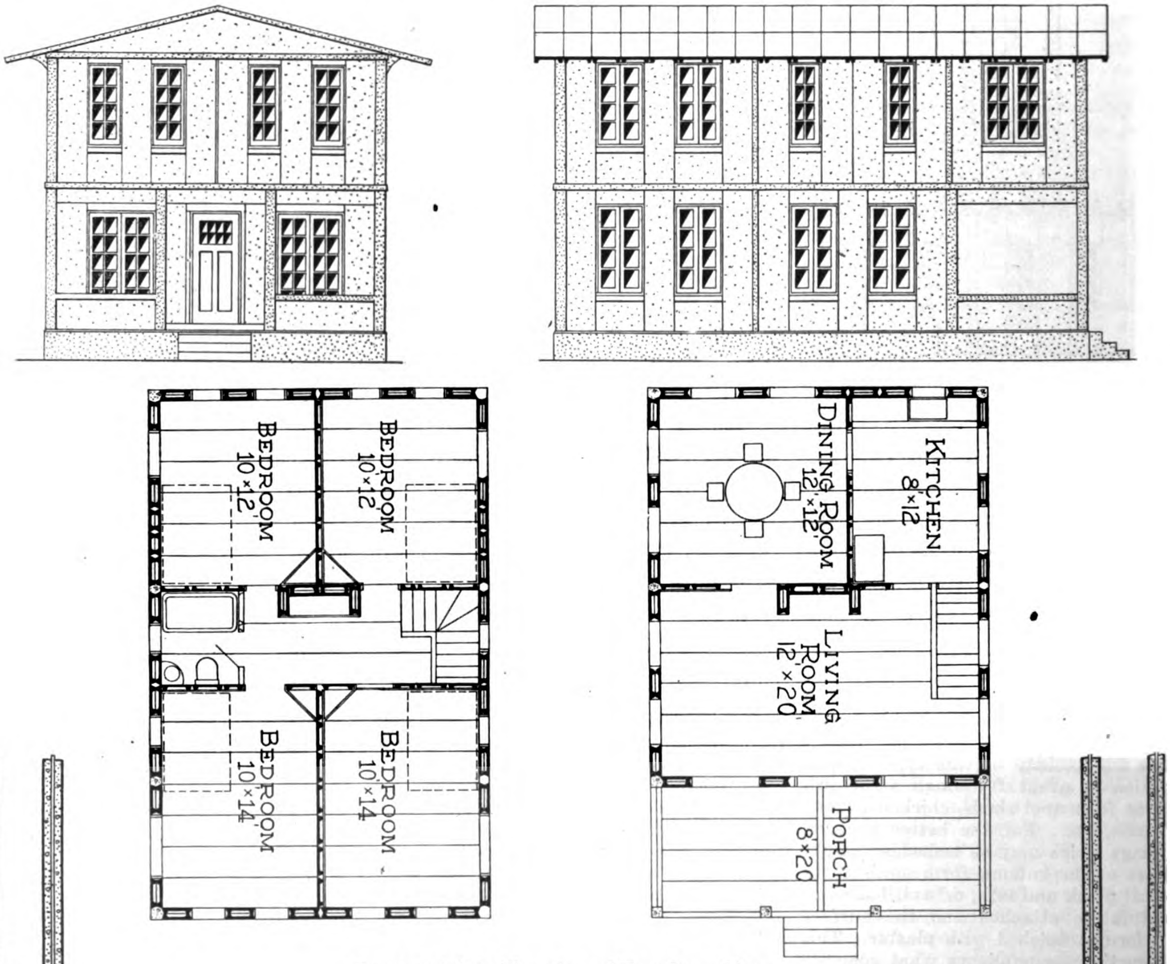


Plan of bungalow, elevations shown above, built of pre-cast units. All plans illustrated show the placing of the units.

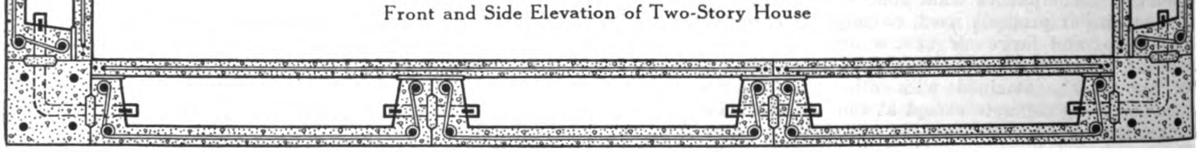
jobs upon which this has been used and in connection with which cost accounts have been carefully kept, show that the unit may be manufactured at a cost of 5 cents per square foot. These figures, however, were obtained about two years ago so are subject to correction now in keeping with added cost of labor and materials. The average cost of transporting units to the building site for a reasonable distance may be figured at ½ cent per square foot. The labor cost of taking them from a pile adjacent to the building site and placing them in the wall or floor averages 1 cent per square foot. The material and labor cost of filling the joints adds another cent per foot of wall surface. Other costs incidental to completing a finished wall having double air spaces brings the cost of construction up to 30 or 32 cents. The single wall costs not to exceed one-half this but usually somewhat less than half. This type of construction should form an ideal adjunct to the builder's regular line.


Garage, Stucco Covered After Erection

Simple plant equipment only is necessary. Steel forms are required in the first instance but carefully handled they will last for an indefinite time. A small power-operated mixer, facilities for aggregate storage indoors, and curing chambers, make this unit proposition a 12-months-in-the-year one, since manufacture can readily be carried on during dull season in winter and a stock of material readily accumulated for use during the usual building season.



Front and Side Elevation of Two-Story House


Wall Detail of the Joining of the Units Used in the New Development of Concrete Units. The air space is a good feature

Legal Department

Where to Get Plans for Lots

From F. R., Pennsylvania.—I am familiar with Transit. Can I lay out and stake out lots without permit?

Where do I apply for it and where should I get information regarding Plans for said lots? Said lots are outside of Pittsburgh City limits but still in Allegheny County. Please state if possible what average price is charged by civil engineers for said work.

Answer—You can get any information you need from the office of the clerk of Allegheny County. The amount charged by civil engineers for surveying varies with the time put in, the amount of work and the locality where the work is done. Surveyors get from $15 to $25 per day on the average. As surveyors must do their work properly or be personally responsible for any damage caused, you must be very careful. The Pennsylvania laws require that compasses and chains must be adjusted. You can inquire about this at the county seat.

What Is a Breach of Contract?

The question, what is a breach of contract, can only be answered after a careful examination of the facts in each particular case.

The provisions of the contract, the things that were done that should not have been done, omissions to do things that a party contracted to do, the time when these acts or omissions occurred, and the intention of the offending party, must all be carefully considered before the question can be answered. Performance of a contract may be either literal or substantial. When nothing has been done, except in the making of a contract, the law requires a literal performance. When part of a work has been done, the law requires only a substantial performance.

If an owner tells a contractor not to erect a building, before the contractor has started the work, the contractor cannot put up a building and sue to recover the contract price, but he must stop when he is directed to do so, and he can then sue for the damages caused by the breach of contract. On the other hand, if a contractor who is already at work is told to discontinue the job, he can of course recover for the work already done, and he need not show that he was ready, able and willing to go ahead with the work, when he is ordered off the job by the owner or his agent. In a case like this the contractor can sue for damages for the breach of contract and he can recover his prospective profits.

All readers are invited to ask any questions whose solution will help them solve any legal difficulty that they may be in. Our legal adviser, George Kaiser, will answer direct by mail and give his opinion as to the correct procedure. Such of the questions and answers as are of general interest to the trade will be published in these columns.

All inquiries must be accompanied by the name and address of the correspondent, so that he may be answered direct or that he may be requested for further information if necessary to the intelligent answering of his question. No names will be published, only initials or a nom de plume. Remember that this service is free to subscribers.

Address Legal Department, Building Age, 243 West 39th Street, New York City.

The question of suspension of work is usually governed by the contract itself, and when it provides that the contractor shall have no claim for damages where the work is suspended, the contractor will not be entitled to any claim for damages when a suspension of work is honestly made.

Where Statute Provides for Registration, Can Architect Practice if Unlicensed?

The Supreme Court of North Dakota held recently that the statute providing for the registration of licensed architects does not abridge the right of a professional architect to continue to practise as an unlicensed architect.

An architect was arrested under the charge that he had violated Chapter 58 of the Session laws of 1917 which provides for the registration of licensed architects.

It was also charged that he had neglected and refused to become licensed and had continued to practise architecture at Fargo, North Dakota, without being licensed, contrary to statute and the rules and regulations of the State Board of Architecture.

It was further contended that he had continued to practise as an architect and had held himself out to be one qualified to practise as such and had made plans and specifications as an architect.

It appeared that the act providing for the registration of architects was originally headed: "AN ACT FOR A BILL PROVIDING FOR THE REGISTRATION OF ARCHITECTS AND FOR REGULATION OF THE PRACTICE OF ARCHITECTURE AS A PROFESSION IN THE STATE OF NORTH DAKOTA." The word "licensed" was finally inserted before the word "architect" and as the bill was finally passed, it read: "NO PERSON SHALL BE ALLOWED TO USE THE TITLE 'LICENSED ARCHITECT' OR ANY VARIATION OF THE SAME, OR ANY OTHER WORDS, LETTERS OR DEVICES TO INDICATE THAT THE PERSON USING THE SAME IS A LICENSED ARCHITECT AFTER THE APPROVAL OF THIS ACT WITHOUT BEING REGISTERED AS AN ARCHITECT IN ACCORDANCE WITH THE PROVISIONS OF THIS ACT."

The court in holding that the man had been improperly arrested and was justified in practising as an "unlicensed architect" said: "It will thus be seen that the title of the act, the prohibitory section and the section referred to, show an intent to provide for the registration of licensed architects and the prohibition of persons from using the title 'licensed architect' without becoming registered in the manner provided. The remainder of the title and other provisions of the act which have undergone no change since the bill was finally introduced, purport to relate to the regulation of architecture as a profession."

Thus the board is authorized to adopt rules and regulations for the regulation of the practice of architecture and it is made its duty to examine into the quality, to regulate and to issue certificates of registration to those desiring to use the title of architect or practise as architects.

Section 32 provides that every architect who is registered under the provisions of the act and who desires to continue to practise architecture in North Dakota shall annually, during the month of July, pay to the secretary of the board the renewal fee of $10.

As the bill originally stood it was doubtless contemplated that the no architect should be permitted to practise without a license and unless the amendments were intended to provide a means of voluntary classification of the profession into licensed and unlicensed groups it is difficult to see their purpose.

It was therefore held that the architect was not guilty of the offence charged under the statute.

When Contractor Abandons Job, Must Owner Pay for Work Done?

Where a contractor abandons a job and the owner completes it the contractor is entitled to recover for work already done and materials furnished according to contract price in proportion to cost of completing the work, less the damages sustained by the owner because of the contractor's failure to complete the work, is the decision in a late Oklahoma case.

The contractor and owner entered into a contract whereby the contractor was to furnish labor and materials and was to remove old and complete a new front in a storeroom in accordance to plans and specifications for $725 if completed within twenty days.

The contractor abandoned the work and the court gave judgment in favor of the owner and held that, as the contractor had abandoned the work and as the owner had already paid $300 to the contractor and the owner had suffered $300 damages because of the contractor's breach of contract, the contractor's claim was more than offset.

Surety Company Need Not Pay Claim for Tools

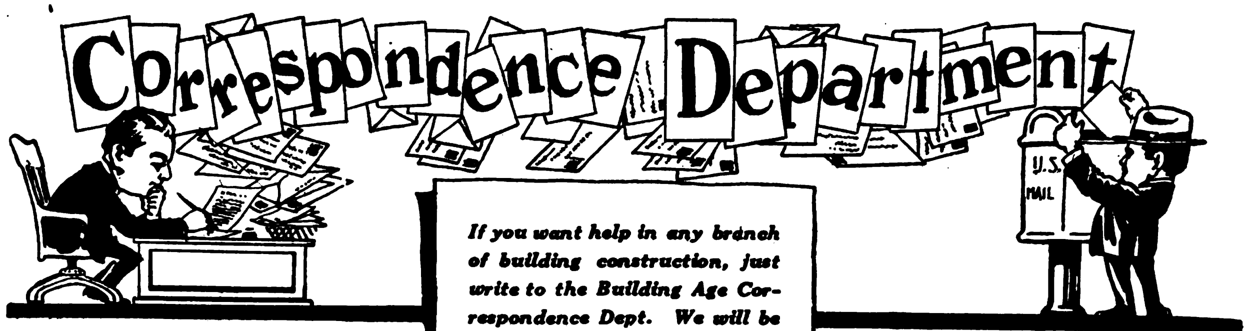
In a recent case an action was brought against the surety on a bond given by a contractor to the city of Long Beach to recover certain amounts alleged to be due for work performed and labor furnished in the construction of two wells.

The contractor had given bond for $4,000 on condition that if he "failed to pay for any materials furnished for the work described in said contract or for any work or labor done thereon" the surety would pay the same.

At the time the work was finished the contractor was in debt several thousand dollars. Several claims against the surety were filed.

The court held that one thousand feet of 2 in. tubing, used solely as an appliance, on the end of which a knife was attached, for use in perforating the case of the well so water would flow, was not materials or supplies used in the performance of the work when they were retained in an unimpaired condition except for ordinary wear and tear by the contractor after the work was finished.

It was further held that the rental and transportation of tools used were "materials or supplies used in the performance of the work and recovery against the sureties was therefore allowed."



If you want help in any branch of building construction, just write to the Building Age Correspondence Dept. We will be glad to answer all your questions without charge.

Questions should be confined to construction only, as the editors cannot undertake to design structures.

All readers are invited to discuss the questions and answers published.

Proper Foundation for Bungalow

From A. Layman Subscriber, Canal Zone.—I intend to have built near Boston, Mass., a bungalow in the future, and to be able to discuss it more intelligently with my architect. I wish your advice on the following.

The bungalow is to be 30 x 43 inside measurements and only two small rooms on the second floor. I wish in the interest of economy to have the cellar only under the last 15 ft. and wish a suggestion as to the balance where I wish a concrete bed with the top finished to be the floor. Is a single bed of concrete possible, or are regular walls to support house walls necessary, and, if so, how deep? And the area within above grade to be filled in with dirt and floor laid on a bed of cinders—should this be separate from walls or integral with same? Want a suggestion as to cheapest construction with protection against frost and cracking. Also I wish the floors finished concrete ruled into squares to simulate tiles, and wish a suggestion for a red and directions as to mixes for this finishing coat.

Answer.—From your letter we take it that you have in mind the idea of dispensing with foundations under that portion of the contemplated bungalow which will not have a cellar under it.

You ask whether a single bed of concrete is feasible or whether regular foundations to support the house walls are necessary. Foundations of some kind are indeed very necessary, and these to be of any use must be carried down below the frost line, which in Massachusetts would call for a foundation not less than 3 ft. 6 in. below grade and preferably 4 ft. below.

Should the floor level of the house be about 12 in. above grade, then a proper foundation could be obtained by placing concrete piers economically spaced to receive the sill timbers. The sill timbers would have to be stronger than otherwise if piers are used as the weight of walls on them must be carried over to the piers.

You also speak of filling within the walls to permit the placing of concrete floor at the proper level; from this it might be assumed that you contemplate keeping the first floor a considerable distance above grade, in which event a continuous foundation wall would have to be provided. In regard to the thickness of such a foundation wall, that would be determined entirely by its height and where you have earth fill behind it. I would recommend that it be 8 in. at the top and increase in thickness from top to bottom ¼ of its height above grade. In other words, if the top of wall should be kept 4 ft. above grade, a wall 12 in. thick would be about right. It could either have a batter on its inner face if 8 in. thick at top, or be carried the same thickness from bottom to top.

The cement floor and the concrete on which it is laid should be laid separate and never integral with the walls.

The proper way to lay a floor such as you propose to use is to lay a bed of 6 in. thick of clean steam cinders on the fill. After it has been well wet and rammed in position to prevent further settlement on cinder fill, lay at least a 4 in. thick bed of cinder concrete, mixed as follows: 1 part of Portland cement, 2 parts of clean sharp sand and 5 parts of clean hard coal steam cinders. Mix and lay, and after tamping same thoroughly and while still green lay 1 in. top finish on same composed of 1 part of Portland cement to 8½ parts of clean sharp sand

with sufficient color added to have it imitate quarry tile.

The proper color to mix with cement and sand to obtain tile color is either Venetian red or burnt sienna. As the colors of the different manufacturers vary in quality, some go further than others, but by experimenting a little the amount of color to be added to the top finish can be readily arrived at, dependent upon the color selected.

Is This Roof Truss Safe?

From T. R. W., West Va.—I am pleased with your correspondence department, and am taking advantage of it by sending the inclosed pencil sketch. Give all information at your disposal.

The building for which this truss is adopted is 75 ft. 3 in. wide and 160 ft. long. These trusses are spaced 16 ft. on centers, with no center posts or supports. Timbers of the truss proper will be built up of 2-in. hemlock, spruce and chestnut, bolted together. What will be the resistance of this truss, and a safe load?

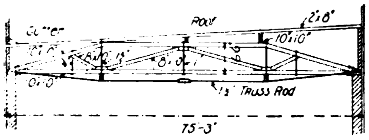
I have built trusses from 40 ft. to 60 ft. in length with success, but have never been up against one of this length. Owing to the scarcity of steel wood was adopted.

Answer—It is not within the scope of this column, which is essentially a correspondence column devoted more to answer, solve or explain abstract problems rather than to design and detail a large structural unit, such as your pencil sketch of a wood truss submitted would involve. However, in order to properly answer your question, let us consider in some detail your proposed composite member. In the first place, your ratio of height to the span is not in accordance with modern theory and good practice, and would develop thrusts in your + members that would require larger sections than you indicate.

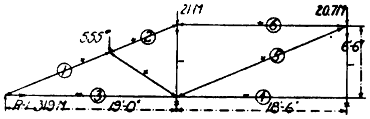
Boseing the live and dead loads on the truss as required by the building laws of all larger cities, the thrust on No. 1-2 inclined struts develops 102.000 lbs. and 104.000 lbs. respectively. And on the top chord, No. 6, 97.000 lbs. Now a 10 x 10 in. spruce member acting as a column as these do, being compressive members, is good only for 71.300 lbs. on a 9 ft. span, 67.900 lbs. on an 11 ft. span and 53.000 lbs. on an 18 ft. 6 in. span, indicating that the members named are stressed beyond the safety factor. No. 5, also a compression member 20 ft. long, is just within the allowable L/W limits prescribed by good engineering practice, and is good for but 31.200 lbs., which is not strong enough. Nos. 3-4 develop 98.000 lbs. and 128.000 lbs. in tension respectively, and are good in spruce for 80.000 lbs. each; this with the allowable stress in your camber rod 1½ steel = 28.300 lbs. still leaves your lower chord lamentably short in resistance to tension.

Your sketch is incomplete in that it does not show how you frame your several joints or develop the heel of the truss, so that it is impossible, without a detailed truss, to give you all the information you desire. We would advise that you submit your plan to a good structural engineer in your vicinity to properly design the truss before you jeopardize your standing as a builder by assembling it as shown on your design, for it is the opinion of the writer that trouble will develop. You will also find it necessary on long spans to devise a good plan of wind and sway bracing to connect the trusses rigidly to insure stability in order that the panel loads will be properly transmitted through the members to the point of reactions, thus preserving equilibrium.

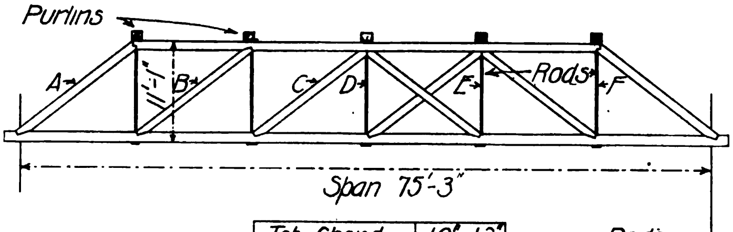
The sketch of a Howe truss shown is suitable for the required span. It should, however, be carefully framed, especially if built up of short members, and the various calculations should be very carefully made. It would probably be best to hand the calculations over to an engineer.



Sketch submitted by correspondent.



Stress diagram of correspondent's truss.



Type of roof truss which experience has proved useful for wide spans.

Top Chord	10"x12"
Bottom Chord	10"x14"
Brace A	10"x12"
Brace B	10"x8"
Brace C	10"x6"

Rods	
D	2"
E	1⅜"
F	1"

Comments on Recent Articles

From D. P. B., Redford, New York.—I have read W. B.'s query and W. G.'s answer in the July issue of the BUILDING AGE regarding How to Obtain a Smooth Surface on Concrete. Greasing and spading will contribute little to the surface of the concrete; spading does not disturb the concrete next the forms. Greasing has no value on the forms even when the forms are of iron. The basic material in cement disintegrates all oils. In making tests of oil mixed concrete for waterproofing, oil did not prevent the cement from sticking firmly to the test wires or the metal pans.

If a very fine surface is wanted the form material should be surfaced to a uniform thickness; it need not be matched; when sufficient form is up line it with tar paper. The paper should not be nailed to the forms; simply tack it on with shingles or pieces of lath or clapboards, draw it tight lengthways and keep it level so no buckles will appear, just as one would do on the side of a wall. Next to the paper place an inch board. You are ready now to pour your concrete; when filled up to near the top of the board let it stand a few minutes while you are getting some 1:1 concrete ready thoroughly wet; then remove the board and pour the 1:1 concrete in its place. It will be a good plan to spade a few inches from the form. This is not a costly nor time killing process. The lumber will come out perfectly clean and dry, and the paper will fall away from the concrete and you will have an even surface as smooth as glass.

If the concrete is to be panelled or have reveals, the forms should be lined with newspaper two thicknesses. It may be put on with paper hanger's paste; this paper will stick firmly to the concrete, but the weather will soon take it off. When forms are lined in this way they may be left up indefinitely. I have lined my forms in this way for years and I get a delicate, smooth surface. The tar paper does not color the concrete in the least.

E. G., New Jersey, can put his blocks in without taking up his floor by simply using keys at the end of his blocks. If such floors are bridged properly with struts before crowning, then rodded if necessary, it will be a better job than blocks.

In looking over John Upton's methods I find several things questionable. Measuring across the square as he does is a fairly good way if one can guess pretty close and doesn't make a mistake, and his rafters are less than 24 ft. long. There are many buildings with a run of more than 24 ft. with a rise of 6 or 8 ft. There are many buildings whose roofs are more than 18 ft. high; then you have to use a fraction of an inch for a foot and errors multiply.

In shingling I have never used a straight edge since a boy. In Kansas I

never saw a straight edge come on a building and I worked in several far removed parts of the state; never saw less than three lines used. Here it is hard to get any one to shingle to more than two lines; straight edges are very rare and a great nuisance anywhere. On hips and valleys and buildings running up to over a hundred feet a straight edge is an abomination. His little shoveling board would be in my way; I keep all the courses together and if a shingle does not fit one course it will the other. On a bet some years ago on the merits of straight edge and chalk line two of us beat three on the other side in running up a 32-ft. roof; they carried up most of their shingles before beginning and did a poor job and lost by five courses in the forenoon.

Where Are Ship Carpenters Being Employed?

From J. W. F., North Dakota—I am interested in the ship building articles running in THE BUILDING AGE, by Mr. A. H. Brenzinger. Am a carpenter, and for some time have been considering the advisability of engaging in this work with the Government Special Service. Will you please tell me where I may secure employment in this line?

Answer—Mr. Henry M. Morse, head of the U. S. Shipyard Volunteers Branch, gives the following information:

The shipyards are calling now for more men of the following trades: riveters, chippers and calkers, loftsmen, shipfitters, shipwrights, boilermakers, coppersmiths, drillers and reamers, marine machinists, marine pipefitters and hull draftsmen. At the present time, the demand is virtually confined to these trades. Men who can do this kind of work can probably be placed almost immediately, provided of course that they are not now working on important war supplies or on material that is to go into ships under construction for the Emergency Fleet Corporation.

The supply of ordinary carpenters is greater at the present time than the demand. We should advise the correspondent, however, to write to the Employment Managers of the following shipyards, stating clearly his experience and qualifications:

Seaborn Shipyards, Tacoma, Washington.

Anacortes Shipbuilding Co., Anacortes, Wash.

Geo. F. Rodgers & Co., Astoria, Ore.

Grant-Smith-Porter Ship Company, Aberdeen, Wash.

Meacham & Babcock Shipbuilding Co., Salmon Bay, Wash.

Wright Shipyards, Tacoma, Wash.

Babare Brothers, Tacoma, Wash.

The Employment Managers of the yards have entire charge of employing the workmen.

I trust that this will help you out.—Henry M. Morse, Head of the U. S. Shipyard Volunteer Branch.

How Should Colonial Fence Be Designed?

From E. F., New York.—A New England Colonial estate is to have a fence around it about 3 ft. high with three rails or boards.

1. What is the best size board to use?
2. How should these most artistically be put on to the posts?
3. What posts should be used to carry out the Colonial idea—rough or square?

Answer—The type of fence you had in mind building is of the kind generally used to enclose pasture land, and not appropriate for enclosing residential property, which I picture a New England estate to be.

Some few years ago while passing through Maryland I noticed that a type of rail fence was in use in connection with Colonial farm houses, the front yards and space around same being used for pasture. The use of a rail fence in this instance was justified as it harmonized with the buildings and surroundings.

A three rail fence is not attractive from an architectural standpoint, and it is mighty hard to make it more attractive or artistic, for it is always a three-rail fence in appearance, lacking artistic charm.

In the event of having pictured your property wrongly the answer to your questions as to how to build a three-rail fence are subdivided as follows:

1. Boards should be 1⅛ in. x 4 in., dressed four sides.
2. They are generally nailed to the face of posts. The best arrangement would be to keep the bottom of the first board 6 in. from ground and 9 in. between the first and second and second and third boards.
3. Square posts with a neat capping would give a Colonial feeling.

If I were in your place I would use a true Colonial fence of simple design similar to illustrations shown, which would enhance the appearance of the property and give satisfaction. In using a fence of this kind you have something Colonial, varying designs of which are to be seen throughout all the New England States. The illustrations shown, if too elaborate, could be considerably modified and cheapened and still be good design.

Four Types of Fences Which Harmonize Well with the Colonial Type of Architecture.

THE EDITOR'S PAGE

The Fourth Liberty Loan Brings Victory Nearer

When the Fourth Liberty Loan Campaign opens Sept. 28, are you ready to do your bit for Uncle Sam? It is a privilege for us here at home to be able to sit safely among our friends and relatives, yet to be able to contribute materially to the winning of the war.

The recent victories "over there" lend encouragement to the view that things are turning in our favor, that by putting our shoulder to the wheel as it slowly moves favorably, we will be able to give the big impetus that will bring victory with an accelerated speed that few of us dare more than hope for.

Let us all get together and try to make the Fourth Liberty Loan a part of this big push; to so dig down in our pockets that the Government may have every dollar it needs, and more too, for the quicker winning of the war. Let us all go to it with a right good will!

The Smaller Contractor Can Get Industrial Housing Business

Housing for factory employees, or industrial housing, as it is generally called, forms one of the big present day outlets for building activity. Industrial housing, war-time factories, farm buildings and repair work are undoubtedly the real sources to-day for business in the building field.

There is absolutely no reason why the small town contractor should not get his share of the industrial housing business if there is any to be had in his particular locality. He is often an expert in small house construction, knowing far more of its problems than does the big city engineer who never designed or built a house until the country's necessity made it the popular thing to do—and the only big source of business. The local contractor who goes out after the town's business knows labor and material conditions in his locality; he knows which of the other local builders and their employees he can readily hire for a patriotic duty. The small town builder often does much of his own work; he can do so now, if labor conditions make it necessary, and induce other builders to co-operate with him to their mutual advantage.

The local man knows just what materials he can get. Therefore he can adapt his work to what is available. If necessary, he can generally put his hands on second-hand material. In general, his acquaintance with local conditions should enable him to do a better job than the big city man, if he has the requisite knowledge and ability.

One of the articles in this issue will give you ideas as to how you can sell your construction abilities to factory owners in need of housing accommodations for their employees. Another article shows you some points which should enable you to finance small housing operations of your own. Still another article points out some of the features to be observed in planning such houses. In the supplement a wealth of illustrations of the best work done so far should enable you to meet off-hand many of the problems that may arise.

Be one of the men who get some of this work. It's entirely possible if you go about getting it with enthusiasm and the determination to stick until you get it.

What Military Successes Will Bring Peace?

The glorious pages of history written down by the Allied armies within the past few weeks have brought up in every eager American heart the question, "When will Germany admit defeat?"

An excellent letter on business conditions, now before me, states that:

"To dictate peace terms to the Kaiser, the Allies must score a decisive victory. In what will a decisive victory consist? In the first place, in order to restore Belgium and recover Alsace-Lorraine for France, it will be necessary to drive the Germans back to the Rhine through a long series of hard-fought battles and thoroughly-prepared campaigns. In the second place, it will be necessary to advance northward from Salonica in the Balkans until Turkey and Bulgaria have been separated from the Teutonic empires, and to organize a military force in Russia sufficiently strong to unseat the Bolsheviki and destroy the German influence in Russia from the Baltic to the Black Sea. This will prove as difficult as the fighting in France will be severe.

"It is agreed that the Allies could not do much in Russia at present, even if they declared war on the Lenine-Trotzky autocracy. The Germans are still in possession of a considerable area of Belgium and France, and Allied man power on the Western front is not yet superior to the German. We must establish an American army of two million or three million men and communications which will supply such an army before we can become vigorously aggressive in Russia. With the co-operation of the Japanese and the Czecho-Slovak army, which is already doing good work in Siberia, however, it would be possible to establish Allied supremacy in Asiatic Russia this year, and pave the way for a gradual movement toward Moscow and Petrograd in 1919. The recent assassinations of von Mirbach, the German ambassador at Moscow, and von Eichhorn, German dictator in the Ukraine, suggest a smoldering fire of unyielding protest against German militarism in Russia which should leap into a flame of open revolution once the Allied armies appear in force sufficient to restore law and order."

The war is not over yet, by any means, and the time of its termination depends much on the ability of Germany to sacrifice more than many believe is possible for her to sacrifice. A strong feeling, so far based mostly on optimistic hopes, predicts such an increase in social unrest under adverse war conditions that Germany will be unable to effectively wage war and will therefore be battered down in a shorter time than would be possible by mere force of arms.

In discussing German military aims, the letter before quoted goes on to state that:

"If the Germans still believe that they can score a decisive victory, it would not be logical for them to apply their main efforts in the direction of Paris. The capture of Paris would not end the war. It is more likely that they would attempt to destroy the British forces in the North and capture the Channel ports. This would enable them to use the English Channel for their submarines and force the English to transport troops and supplies to the western coast of France, where the submarines could more easily attack them, as well as American transports. If they still believe in a German victory we might also expect them to risk a general naval battle with the Allied fleets. Obviously, to be victorious in the West, they must keep American and British supplies from the French coast by the use of submarines or the German battle fleet. If, however, they do not attempt either to capture the Channel ports or vanquish the British navy this summer, it may logically be concluded that the Kaiser no longer expects to destroy the Allied armies in the West, and will attempt to continue in favor with the German people by annexing new territory in Russia after a successful defensive until the end of the war, meanwhile satisfying the popular demand for military victories by minor successes in Italy, the Balkans or on the Russian front."

Developments since those words were penned lend added force to them. In view of their wide, timely explanation of the military situation, I am glad to pass them on.

What the Government Is Doing to Solve the Labor Problem

All independent recruiting of common labor by manufacturers employing over 100 men will be forbidden after Aug. 1. All war industries employing over 100 men after that date will be supplied with common labor only through the United

States Employment Service of the Department of Labor. The Government's idea is to stop the constant practice of labor stealing and poaching which has continually served to increase the labor turnover and work considerable harm to the war industries.

These restrictions apply only to common labor at present. But as soon as possible, these restrictions will be extended to include skilled labor.

Non-essential industries will be drawn on so that the war industries may have sufficient labor, but efforts will be made to protect the individual employer as much as possible.

The country has been divided into thirteen federal districts, each in charge of a superintendent of the United States Employment Service. The districts are sub-divided into states, each in charge of a State Director. Local community labor boards will be formed in each community, having jurisdiction over the recruiting and distributing of labor in its locality.

Every effort will be made to keep labor in the home town. No labor can be removed from the community by the Employment Service without the consent of the State Director. No labor can be removed from state to state without the approval of the United States Employment Service at Washington.

Farm labor will be protected, and special efforts will be made to keep the farmer supplied with adequate help.

The requirement that unskilled labor must be recruited through the sole agency of the United States Employment Service does not at present apply in the following five cases:

1. Labor which is not directly or indirectly solicited.
2. Labor for the railroads.
3. Farm labor—to be recruited in accordance with existing arrangements with the Department of Agriculture.
4. Labor for non-war work.
5. Labor for establishments whose maximum force does not exceed one hundred.

A survey of unskilled labor for war industries requirements will be made. Each state will then be assigned a quota to be filled by drawing men from non-essential industries in the state; state quotas will be distributed among localities. In each locality employers in non-war work will be asked to distribute the local quotas among themselves.

The idea of this method of drawing labor according to quotas is to use local supply for local demand as far as possible and to avoid draining any community of labor.

The Specialist in Small Houses Is the Man of the Hour

The housing specialist has come into his own. This is encouraging to the designers of small houses. The architect of small work has at his command no such money facilities for the gaining of beautiful but expensive effects, as has the designer of the bigger work; his effects must be gained simply and inexpensively. His knowledge of design must be fully as great as that of his more pretentious brother, even though it takes a different form of expression.

The designer of small homes has in the past often been looked down upon as a cheap sort of inferior architect. But now he has the satisfaction of seeing experts in factory, office, and other large work, eagerly posing as housing experts—men who never designed a small house and who never expected to, now delve earnestly into the subject and only too often turn out the botches that one would expect from their lack of experience.

To-day is the time when the small house designer can smile, feeling that he is the man who has not failed his country in her hour of need.

Don't Repeat the War Lies You Hear

Pro-German propaganda is most efficacious when it consists in spreading plausible lies. The stories that everyone hears, and that no one can verify, may work more harm in undermining the morale of a nation than the enemy's guns.

You've heard many such stories, undoubtedly. Of how the President was bribed by England, of how the nation is to be rationed just so that the other Allies can live in plenty, of how American lives are being sacrificed while the soldiers of the other allied nations are being retired to safety, of the graft and corruption that characterizes the Red Cross, and so on ad infinitum.

Most of the stories current are of this description, ridiculously transparent to the man who stops to think. But the poison takes its venom from the constant repetition, the continual undermining current coming from all sources of the town.

Keep a close rein on your tongue. When you hear a pro-German lie ask how your informant got his news. Pin him down to definite facts, and prove his lie.

You Can Help Mobilize Labor

The Department of Labor recently announced that war industries are in need of 400,000 common laborers, in addition to the need for skilled hands. In view of the labor shortage prevailing in practically every industry, non-essential as well essential, it seems as if the magnet of war wages was not as strong as it might be.

There is, as yet, no dearth of man power in the United States. There are plenty of men available for winning the war, industrially as well as on the field of battle. The real trouble lies in the lack of proper mobilization of labor, although government efforts are tending to bring improvement in that direction.

In every town and city there is the man who works at odd jobs, more or less unsteadily. Ten or twelve dollars weekly has been good money to him; his ambition and middle age inertia does not spur him on to learn a skilled trade, in which he would be all important. So he drifts aimlessly from one job to another, unsteadily teetering around temporarily enjoying what are, to him, fabulous wages.

Never before has the unskilled man had such an opportunity open to him. But only too often, just how often is revealed by the urgent need for war workers, is he content to hold down an easy, shiftless job at small wages when he might quickly become a skilled worker and a prosperous buyer of Liberty Bonds.

Those of us who know such men should take it upon ourselves to try to awaken a spark of ambition in them, to put them in touch with war industries which need men, and to constitute ourselves efficient aids in solving the urgent labor problem. It is a patriotic duty which will go far toward helping to win the war.

Building Activity Throughout the United States

Continued curtailing of all construction not essential to the winning of the war is shown by the loss of 26 per cent for the month of July, 1918, compared with July, 1917, this figure being for the country at large; the total volume is $42,692,860 as against $57,566,344. The total number of cities reporting totals 150, 52 of these showing a gain.

In the eastern section of the country, a loss of 21 per cent is reported, 13 out of 58 cities showing gains; the middle section reports a loss of 36 per cent, 15 out of 41 cities showing gains; the south reports a loss of 34 per cent, 13 out of 31 cities showing gains. The western section of the country shows quite a bit of activity; out of 20 cities reporting, 11

show a gain, there being an increase of 6 per cent.

The decreased building activity is, as usual, accounted for by material prices and shortage of material and labor, due to Government demands and the draft. Yet in industrial lines particularly, much new work is being done. For instance, Cleveland, Ohio, reports that "the general run of building work is far below that of any for the past five years, but that in connection with manufacturing it is above any of the last five years." Wilmington, Del., reports that "Slackening up is due to brickyards being commandeered."

Detailed reports submitted by the building inspectors of the various cities are as follows:

CITIES IN EASTERN STATES

	July, 1918				July, 1917			
	New Work		Repairs		New Work		Repairs	
	Permits	Value	Permits	Value	Permits	Value	Permits	Value
Albany, N. Y.	122	$100,955	...	....	146	$119,865	...	....
Allentown, Pa.	17	51,300	...	....	28	106,230	...	....
Altoona, Pa.	11	3,987	46	17,133	11	12,325	24	66,372
Atlantic City, N. J.	7	13,915	36	5,865	3	9,875	54	11,073
Auburn, N. Y.	16	26,055	...	....	19	29,935	...	....
Bayonne, N. J.	23	56,300	...	....	22	112,275	...	....
Binghamton, N. Y.	49	149,497	68	10,116	66	115,308	114	18,067
Boston, Mass.	61	341,330	364	327,920	115	1,086,717	311	430,146
Bridgeport, Conn.	107	320,526	...	....	128	334,020	...	....
Brockton, Mass.	21	14,070	12	7,285	17	156,900	13	2,340
Buffalo, N. Y.	269	871,300	75	100,300	408	1,472,000	...	....
Camden, N. J.	..	95,025	...	....	...	24,623	..	....
East Orange, N. J.	30	196,248	...	....	37	109,635	...	....
Elizabeth, N. J.	23	54,787	...	....	26	78,138	...	....
Erie, Pa.	116	206,903	...	....	112	224,209	...	....
Harrisburg, Pa.	27	22,985	...	....	23	113,860	...	....
Hartford, Conn.	91	272,110	...	....	76	317,130	...	....
Hoboken, N. J.	5	5,870	12	7,275	4	15,000	13	8,800
Holyoke, Mass.	4	9,650	2	1,400	10	30,500	4	640
Jersey City, N. J.	58	697,230	...	....	72	255,238	...	....
Lawrence, Mass.	18	60,541	7	47,575	10	18,000	6	8,125
Manchester, N. H.	59	50,655	...	....	66	48,969	...	....
Mount Vernon, N. Y.	17	48,550	5	3,050	15	34,300	11	26,500
Fitchburg, Mass.	22	108,377	...	....	25	21,682	...	....
Newark, N. J.	179	635,722	...	....	177	666,049	...	....
New Bedford, Mass.	34	57,437	...	....	24	70,850	...	....
New Haven, Conn.	97	110,689	...	....	103	444,912	...	....
New York	19	760,500	154	71,716	56	1,173,900	234	109,366
Manhattan	13	495,800	239	1,229,845	20	953,500	293	940,595
Bronx	173	832,216	...	....	290	1,283,266	...	....
Brooklyn	261	1,893,281	793	526,955	103	1,418,225	740	557,181
Queens	577	542,656	...	....	445	673,125	...	....
Richmond	90	189,370	...	....	23	124,650	...	....
Nutley, N. J.	2	2,150	4	225	9	21,150	11	327
Passaic, N. J.	10	3,150	11	12,075	15	47,455	11	7,155
Paterson, N. J.	88	125,933	...	....	75	96,237	...	....
Philadelphia, Pa.	226	802,580	350	338,465	592	5,195,365	...	....
Pittsburgh, Pa.	272	978,642	...	....	278	1,375,752	...	....
Portland, Me.	12	61,965	17	11,950	14	14,675	15	110,550
Quincy, Mass.	53	75,447	...	....	51	195,258	...	....
Reading, Pa.	26	180,850	136	51,625	33	58,275	102	13,525
Rochester, N. Y.	50	30,815	63	29,740	107	506,497	78	68,051
Schenectady, N. Y.	41	121,992	31	13,535	37	374,280	30	21,765
Scranton, Pa.	20	91,047	...	....	34	52,723	...	....
Springfield, Mass.	84	124,035	...	....	108	170,382	...	....
Syracuse, N. Y.	53	92,905	67	69,830	65	292,584	75	29,080
Trenton, N. J.	38	31,060	...	....	38	114,631	...	....
Lowell, Mass.	55	30,745	...	....	251	31,933	...	....
Lynn, Mass.	28	11,045	...	....	24	28,370	...	....
Troy, N. Y.	21	9,250	21	9,250	39	25,210	...	....
Utica, N. Y.	27	93,100	14	16,450	28	94,050	12	39,770
Wilkes-Barre, Pa.	61	40,335	...	....	66	59,234	...	....
Worcester, Mass.	146	246,714	...	....	138	309,928	...	....
Yonkers, N. Y.	17	30,000	...	....	41	167,200	...	....
York, Pa.	32	13,651	...	....	35	8,335	...	....
Malden, Mass.	37	33,350	...	....	24	28,370	...	....
Salem, Mass.	32	32,631	...	....	47	113,525	...	....
Somerville, Mass.	22	149,200	...	....	39	73,050	...	....
	4069	$11,957,839	2537	$3,069,580	5002	$20,904,620	2151	$2,469,428

CITIES IN EXTREME WESTERN STATES

	July, 1918				July, 1917			
	New Work		Repairs		New Work		Repairs	
	Permits	Value	Permits	Value	Permits	Value	Permits	Value
Berkeley, Cal.	15	$42,000	43	$18,000	21	$180,500	57	$24,000
Colorado Spgs., Colo.	8	3,700	9	3,640	5	750	7	6,360
Denver, Colo.	98	330,250	100	58,450	95	158,550	95	58,850
Long Beach, Cal.	274	290,574	...	....	66	82,565	...	....
Los Angeles, Cal.	324	720,935	232	99,545	241	884,020	203	219,788
Oakland, Cal.	203	386,021	70	42,369	180	288,400	69	56,685
Pasadena, Cal.	14	11,622	47	25,652	28	171,480	42	31,047
Portland, Ore.	252	267,350	266	104,205	107	287,430	153	71,525
Pueblo, Col.	48	134,184	...	....	36	62,605	...	....
Sacramento, Cal.	61	61,982	...	....	53	65,298	...	....
Salt Lake City, Utah.	51	119,430	...	....	46	194,700	...	....
San Diego, Cal.	29	48,145	58	35,715	33	26,710	42	48,275
San Francisco, Cal.	321	850,073	...	....	380	917,850	...	....
San Jose, Cal.	26	60,980	...	....	24	27,989	...	....
Seattle, Wash.	1080	912,985	...	....	516	475,190	...	....
Spokane, Wash.	30	10,135	20	42,825	48	85,225	25	173,105
Stockton, Cal.	69	53,889	...	....	46	110,829	...	....
Tacoma, Wash.	191	222,198	82	22,673	39	46,546	31	26,395
Eureka, Cal.	4	3,000	10	3,500	1	2,500	4	1,200
Fresno, Cal.	57	158,000	43	16,183	39	257,203	29	10,768
	3155	$4,681,053	980	$472,757	1994	$4,126,040	757	$727,9[illegible]8

CITIES IN MIDDLE STATES

	July, 1918				July, 1917			
	New Work		Repairs		New Work		Repairs	
	Permits	Value	Permits	Value	Permits	Value	Permits	Value
Akron, Ohio	203	$780,605	62	$31,945	406	$1,056,078	63	$61,880
Canton, Ohio	40	108,450	34	7,162	67	216,705	...	....
Cedar Rapids, Iowa.	22	141,000	10	15,000	33	189,000	16	26,000
Chicago, Illinois	292	4,885,600	865	264,360	32	4,204,100	...	....
Cincinnati, Ohio	919	396,648	...	....	993	707,615	...	....
Cleveland, Ohio	184	1,108,600	689	273,800	302	2,254,050	735	413,480
Columbus, Ohio	66	99,260	56	30,645	103	200,400	58	68,335
Davenport, Iowa	95	99.877	...	....	73	62,053	...	....
Dayton, Ohio	114	289,200	44	35,069	122	257,678	...	....
Des Moines, Iowa	61	602,858	...	....	44	103,310	...	....
Detroit, Mich.	831	2,210,880	...	....	1100	4,188,470	...	....
Dubuque, Iowa	6	6,720	...	....	13	34,980	...	....
Duluth, Minn.	127	283,190	...	....	156	315,561	...	....
East St. Louis, Ill.	14	168,300	8	2,525	10	21,825	12	12,225
Grand Rapids, Mich.	132	109,692	...	....	107	180,885	...	....
Indianapolis, Ind.	483	651,808	...	....	421	516,804	...	....
Jackson, Mich.	33	19,225	...	....	50	142,975	...	....
Joplin, Mo.	10	11,310	5	1,416	28	60,575	5	1,825
Kansas City, Kan.	35	36,975	...	....	49	57,480	...	....
Kansas City, Mo.	178	245,650	...	....	306	1,040,740	...	....
Lincoln, Nebr.	33	63,360	...	....	33	74,875	...	....
Milwaukee, Wis.	232	650,676	...	....	276	924,489	...	....
Decatur, Ill.	20	81,675	5	4,650	17	168,650	11	4,975
Boise, Idaho	2	12,000	12	4,301	...	....	15	10,465
Minneapolis, Minn.	388	1,118,000	...	....	454	979,885	...	....
Omaha, Nebr.	111	320,840	...	....	102	656,250	...	....
Peoria, Ill.	29	55,055	...	....	42	568,480	...	....
Saginaw, Mich.	69	98,798	...	....	53	65,298	...	....
St. Louis, Mo.	199	966,040	296	193,495	288	1,177,608	350	174,595
St. Paul, Minn.	167	362,747	...	....	263	1,014,635	...	....
Sioux City, Iowa	50	270,965	...	....	50	241,210	...	....
South Bend, Ind.	107	347,711	...	....	111	282,163	...	....
Springfield, Ill.	10	30,190	37	18,105	34	50,640	24	18,445
Superior, Wis.	76	34,399	...	....	103	195,420	...	....
Terre Haute, Ind.	37	38,730	30	18,725	20	47,149	...	....
Toledo, Ohio	153	449,922	...	....	319	361,055	21	14,635
Topeka, Kan.	15	18,375	...	....	26	47,280	...	....
Wichita, Kan.	50	144,400	...	....	61	453,174	...	....
Youngstown, Ohio	195	492,500	26	11,975	103	231,005	16	126,175
Joliet, Ill.	9	31,500	...	....	8	66,500	...	....
Springfield, Mo.	19	16,685	...	....	27	59,500	...	....
	5786	$17,899,436	2179	$883,173	7288	$22,776,550	1326	$933,035

CITIES IN SOUTHERN STATES

	July, 1918				July, 1917			
	New Work		Repairs		New Work		Repairs	
	Permits	Value	Permits	Value	Permits	Value	Permits	Value
Atlanta, Ga.	114	$321,135	86	$117,933	102	$277,600	82	$54,246
Baltimore, Md.	119	217,000	583	189,000	115	598,980	626	181,335
Birmingham, Ala.	277	81,851	...	....	360	242,508	...	....
Charleston, S. C.	24	29,950	...	....	20	22,870	...	....
Charlotte, N. C.	10	29,300	10	19,660	13	53,485	...	....
Chattanooga, Tenn.	158	106,601	...	....	146	89,489	...	....
Corpus Christi, Tex.	14	1,565	...	....	9	835	...	....
Dallas, Tex.	15	40,824	35	54,030	27	89,212	41	56,508
Jacksonville, Fla.	51	129,878	...	....	39	709,650	...	....
Houston, Tex.	179	247,134	...	....	197	192,927	...	....
Huntington, W. Va.	31	115,980	...	....	29	49,993	...	....
Knoxville, Tenn.	68	40,180	...	....	99	60,467	...	....
Louisville, Ky.	64	189,590	43	18,195	31	141,450	45	27,220
Memphis, Tenn.	38	42,204	...	....	119	274,670	...	....
Miami, Fla.	47	143,700	...	....	72	189,429	...	....
Montgomery, Ala.	82	15,395	...	....	118	33,749	...	....
Nashville, Tenn.	288	53,520	...	....	340	73,830	...	....
New Orleans, La.	19	124,646	40	58,403	52	787,048	13	31,476
Portsmouth, Va.	21	33,870	...	....	9	6,670	...	....
Oklahoma City, Okla.	75	317,269	...	....	66	233,575	...	....
Richmond, Va.	22	25,405	60	45,147	32	110,783	54	72,058
Roanoke, Va.	14	19,780	...	....	30	59,625	...	....
San Antonio, Tex.	240	189,178	...	....	106	126,370	...	....
Savannah, Ga.	21	10,170	...	....	22	34,200	...	....
Covington, Ky.	8	6,150	...	....	32	12,265	...	....
Tampa, Fla.	59	34,027	...	....	110	130,702	...	....
Washington, D. C.	88	297,210	255	134,960	57	478,780	261	165,890
Wilmington, Del.	37	93,561	75	70,850	43	259,768	71	66,757
Fort Worth, Tex.	60	198,180	...	....	39	64,596	...	....
Galveston, Tex.	308	15,194	...	....	139	14,865	...	....
Wheeling, W. Va.	49	50,067	...	....	49	32,802	...	....
	2600	$3,020,514	1147	$708,208	2612	$4,963,193	1093	$655,480

How the Lumber Dealer Can Profitably Handle Small-Lot Sales

Small-Lot Sales Are Often a Nuisance, but If Handled Right They Can Be Turned Into Big Profit Builders

Every building material dealer is acquainted with the old and well-tested practice of advertising "leaders" at low prices to bring customers to department and dry goods stores. The customer who comes to buy a bargain usually stays to buy other goods at regular prices and thus many profitable sales are made. In the building material field this plan of building business has not generally been regarded as feasible, for the reason that as the business is commonly conducted, the small sale usually involves trouble and expense out of proportion to the benefits the dealer may expect to derive from encouraging this sort of business and the sale of a few pieces of lumber or a sack of cement does not readily lead to a larger and really profitable sale of the sort the dealer is anxious to make.

There is a way, however, by which the dealer can make a profit out of small sales and at the same time turn them into a decidedly strong business-building influence. And the plan does not involve much expense or trouble, beyond a special arrangement and assortment of stock that is most frequently called for by customers.

Anyone who has tried to buy a few pieces of lumber in the average community knows that it is easier to purchase a piano or a house and lot—simply because the average lumber dealer has no facilities for convenient handling of such business. Yet every house owner has occasion to use a little lumber now and then—perhaps a few boards to make a window box or for repairing a fence, sometimes a piece of molding or a couple of 2 x 4's. In the large cities such purchases are made with very considerable difficulty and the customer, even if he gets what he wants, usually goes away with the uncomfortable feeling that he has made a nuisance of himself; and that means, of course, that he carries away some resentment against the dealer who showed a little too plainly that such business was not wanted. It was out of this situation that the department stores in some of the large cities were able to evolve a profit out of the sale and delivery of certain items of lumber, moldings, etc., at prices that on a per-thousand basis seem almost exorbitant.

Good will in the small sales builds up good will for the big sales of the customer and his friends. It is worth while for you to pay courteous attention to the man who comes in for a few feet of lumber to build a chicken coop. Not only that, but it will pay you to make a specialty of suggesting uses for odds and ends of lumber about the yard. Advertise these uses and sell the lumber. It is a good source of business these days.

The importance of retaining the good will of every possible customer is too well known to need any discussion here. The man or woman who is in the market for a board or two to-day may be ready to build a house or barn next month. And the absence of a friendly feeling toward the dealer, based on a little good service in small matters may send that home or barn bill to a mail-order house.

A comparatively small assortment of stock in the way of lumber, molding, lath, roofing material, cement, etc., will take care of the ordinary demands of this class of trade and can be efficiently and conveniently placed where the customer can look it over and make his selections without having to travel all over the premises while single pieces are being removed from lumber piles and bins. The experience of the average yard manager will form an adequate basis on which to lay out a department of this sort. A neat rack should be constructed for the storage of strips, moldings, short length boards, etc., and each compartment of the rack should bear a price mark in plain figures applying to its contents. This sort of material should be sold at so much per piece or by the lineal foot—not in any case on a board measure basis, except when the purchase is large enough to justify taking it out of regular stock. The assortment should include material for making shelves—such as are put up in clothes-closets, bathrooms, kitchens, etc.—book racks, rough tables, medicine chests and other such things that the average person sometimes prefers to make for his own use; also picture molding, plate rail, chair rail, and other commonly used moldings. Short scantling and an assortment of short strips of various widths, and a stock of cement will complete the stock of the "Odds and Ends" department. The softwoods carried in this stock should be of varieties that are easily worked, such as white pine or soft shortleaf, and clear material will be found to give most satisfaction for the average buyer's use, even at a considerably higher price.

In the case of a dealer who operates a light motor truck, small purchases of this sort may well be delivered at reasonable distance, but a nominal charge to cover delivery cost may properly be made and will not be resented by fair-minded customers, particularly if they are tactfully made to understand that this business is handled as a matter of accommodation and not because there is a profit in it.

The dealer who puts in a special stock of this sort and who has a good power rip saw can make a profit by cutting up some of his stock, raising the grade on a piece here and there by cutting out a defect and throwing the resulting strip

into the small lots rack. He can also use a larger percentage of short lengths, because much of this business will call for pieces of a length that the customer can conveniently carry away.

Material for the small buyer should always be sold on a piece or lineal foot basis, never on a board-measure basis. The average man neither knows nor cares anything about board measure.

Every accommodation sale should be rung up on the cash register if possible. The practice of charging and billing these small sales involves an unwarranted expense and one that can be readily dispensed with if the dealer chooses. A well-displayed card sign announcing that prices on small lots are strictly cash will help to secure payment without giving offense to the customer.

The dealer who puts in a department of this sort should make use of it as a means of attracting people to his establishment. He should advertise it and in doing so he should bring out prominently that he is operating a store at which goods are sold just as they are at the drug store or the hardware store. The term "lumber yard" is unfortunate in its effect on many customers. It still conjures up pictures of the old-time lumber establishment, noted for its sawdust-covered floor, unclean cuspidors, cobwebs and generally disreputable appearance. That type of lumber yard office has passed in most communities, but many people are not aware of the fact. Impress on them that a building materials store is another thing altogether and it will occupy a much higher place in their esteem. Of course a good show window will go far toward accomplishing this if the establishment is located where such a method of advertising is feasible. Such goods can then be displayed with prices shown and helpful suggestions as to the many handy things that can be made out of them at very small cost.

Small lot sales should be made on a strictly cash basis if possible. There is not enough profit in them for you to be able to take the chance of possible loss.

The Way In Which Some Woods Became Popular

A Few Interesting Stories Behind the Vogue of Present Day Woods

To the newer generation, that is to those youngsters who have come into the lumber business in a full-fledged way in the past few years, the relative values of different species of lumber—lumber from different species of our native woods—presents simply an interesting study in comparisons between the different standard lumber offerings that have all attained general public recognition. To the older generation, however, a different and much broader interest presents itself, because many of the older boys in the business have witnessed the gradual passing of what was one time termed the cheap or valueless woods into full recognition, and often to a point of value in excess of the woods for which they were introduced at one time as substitutes because of the cheapness. There unfolds a vista before the mental vision of the old timer who has followed the development in the various species of wood in which some of these despised woods have attained wonderful progress.

Cottonwood's First Tryout

One mental picture of this kind that persistently recurs to the writer's mind is that of a southern millman who just about a quarter of a century ago, during a season in which their pine log supply was very limited and about cut out, conceived the idea of cutting a lot of cottonwood along the river banks and bottoms and seeing what could be done in this way toward developing a market for it. The result of this effort was to cause considerable worry and trouble in the mechanical end of the mill, with the saws burning and dodging and giving trouble generally in working what was termed the woolly cottonwood. Then finally so much trouble was encountered in efforts to market it among box factories that much of it was left in the pile to rot. This millman said that he had hoped to dispose of it among the box factories at a price that would net him at least $8 for the log run, f.o.b. the mill, but somehow it did not go readily and he became discouraged and quit it. There is no need to follow the matter up and tell what finally did happen to cottonwood and how it came to be extensively used and highly valued, because that is familiar history and cottonwood in the market today bespeaks its own value.

Birch went through its period of being ignored from a sawmill standpoint because the sawmills in the birch territory were looking for white pine and nothing else—no hardwood made an appeal to them. A little maple was cut and was required by the industries, but generally this was gotten out by mills specializing in hardwood. In the early development of southern pine milling operations it was pretty much the same story. Oak, hickory and other hardwoods were ignored. Then later, even when the hardwood mills were actively cutting these, gum was looked upon as more of a nuisance than a timber having stumpage value.

Gum Has Remarkable Record

Gum perhaps furnishes one of the most remarkable records in the industry of lumbering among our native woods. It started with fewer friends and less to commend it than many other woods which have been introduced as substitutes for other woods. It was hard, it would split, warp and twist and do everything else but behave like good lumber should, and because of these things it was more generally condemned throughout the country than any lumber product ever offered. For many years it made its progress on its cheapness, in the face of the opposition of machine men, cabinet workers, and everybody else but the purchasing agent who saw in it a saving in first cost. Today gum is ditinguished by the fact that it leads the hardwood list in many lines of consumption. Red and figured gum are today more conspicuous items in many furniture factories than oak, which has been a sort of dominant item in the cabinet world ever since before the first tree was cut in American forests. Not only that, but the sap and white wood has attained a point of value that makes gum stumpage a might desirable thing to possess these days.

Every Native Wood Finds Use

It is more or less the same story, with variations, among all of the native woods,

even including willow, which grows to commercial size in the lower Mississippi River country, and there is no longer such a thing as a cheap wood in the old sense of the term. Practically every native wood growing to commercial size and in quantities that justify has found its place in the lumber world and attained a value fairly in keeping with its qualities for the various purposes requiring it.

Indeed, it may be said that some of the cheaper woods, that is, those which in the early days were regarded as having but little stumpage value, have made more progress and attained higher values comparatively than some of the woods of more generally recognized merit that have been in use for a much greater length of time.

As illustrative of this point, there is hickory, which has more intrinsic value than any native wood, being sold in some instances at lower price than ash. Really in the list of comparative values hickory should lead all our native woods, because there is no real substitute for it, the quantity is limited, and the limited quantity in the United States must supply the needs of the world. The fact that it is not more highly valued is a plain indication that we have not yet fully appreciated the worth of our hickory.

Woods of Incidental Occurrence

There are some woods of incidental occurrence, like persimmon and dogwood, which have never been cheap woods so far as the cost to the final consumer is concerned. These are woods that we are just beginning to appreciate have some stumpage value because they are now much sought after and bring comparatively high prices—that is, the products from them do.

What the old-timer sees in a comparison of lumber values today is a sort of two-fold vision: one of a great development of our wood-working and wood-consuming industries, making a broader marketing field with an infinite variety of requirements to furnish consumption for all the different species of timber grown. On the other side there is a vision of these many one-time despised cheap woods coming into their own and getting public recognition for what they are worth.—*Lumber.*

Save Time and Money by System in the Yard

You can go into the average retail lumber yard and find upon inquiring for a hammer or a saw that the boss or first man will call, "Charlie, what did you do with the saw?" and nine times out of ten Charlie will start to hunt for it. In the spring, after the walks have been shoveled off and drains have been dug beneath the foundations the shovel is discarded or thrown into the first empty bin and there allowed to remain until required again.

Go to the coal shed and in all likelihood you will find that coal shovels and forks are scattered all over the place. Frequently they are to be found in the lower end of the yard, quite a distance from the job.

Upon going into the sash and door house to look over the stock and determine sizes, you will probably be greeted with: "We had a yard stick out here. I wonder who has taken it. Wait a minute and I will run in and get my rule."

Binder chains, fence tightener chains and appliances are thrown off the wagon near the stable just before or after unhitching, and there they are allowed to remain until needed.

The grease for wagons and trucks is invariably thrown into the corner of the stable where dust and hay is allowed to collect until the wagon begins to call for help.

Sleds used under wagon-boxes during the winter months are left on the spot where the last vanishing snow left them, and the chances are they are allowed to remain in the way during the balance of the year, compelling the customer as well as the boss' team to drive around them, causing a waste of time and energy.

In the fall the chances are the poker, coal scuttle and perhaps some of the pipe will have been lost, and the boss merely comments: "We can't keep a thing around this place; someone is always carrying them off."

Why is it that companies take stock of their lumber and building supplies year after year without including wagons, tools and appliances that are easily carried away.

These are bought out of the petty cash fund, and the old-time auditor seldom thinks anything about a thing of this kind. The sight of a new saw or hammer causes no comment.

Looking for things all the time is characteristic of many retail yards and offices.

Managers learn only after it is too late, that they are out of this or that form, then they blame the general office for having such a complicated system of books and exclaim, "Damn such red tape."

We believe the boss is to blame. We *know* he is to blame, regardless of whether he is running a one-yard stand or a hundred-yard stand. As a captain of industry the boss should get out and mix with his men. That is the only way he can get first-hand information as to what is going on.

You cannot criticise your customers for not building machine sheds or leaving their new cars stand out in the rain when you, for lack of appreciation of the money you have invested in your tools, allow them to be thrown from place to place. There is only one way and that is the right way. Have a place for your tools and keep them there. Good management and success demands this of you.

English Building Prices and Economy in Future Work

There is no question at all that the conditions under which building will have to be carried on after the war will enforce the closest attention by architects and builders to the substitution of new materials and methods of construction for those hitherto in vogue. A prominent surveyor recently expressed the opinion that the present level of building prices was likely to obtain for at least ten years after the war, so on any such assumption economy alone would dictate every possible effort in this direction. For ourselves, we incline to an alternative view, also given publicity, that when the war pressure has been relieved there will be an immediate tendency for prices to ease off from their present abnormal height, and within a reasonable time fix themselves at 35 per cent to 40 per cent above pre-war figures, with the prospect of remaining there. A considerable factor in the present situation is the uncertainty of the position from day to day with regard to labor and materials, and until this can be somewhat stabilized, as it must be fairly soon after the cessation of hostilities, builders must be expected to cover themselves very amply or face the prospect of personal catastrophe.

Whatever the present position may be, however, a higher level of prices for the future is certain, and it is not too early

to investigate possible ways of mitigating the difficulties arising therefrom.

This was recognized to some extent by the promoters of the recent official Cottage Competition in asking competitors for suggestions to this end. In effect, the response was feeble, competitors in general being content to work much along the old lines, beyond proposing the use of concrete for the upper floors and in some cases for constructing the staircases.

In the case of large building schemes, concrete construction had been gradually pushing itself into the foreground even before the war, and it seems likely now to establish itself as the universal material for the framework of future buildings of any considerable size. The avoidance of timber, except for temporary sheeting and strutting, and also the use of steel in light and easily handled rods and bars instead of heavy sections, are the principal features upon which this opinion is based.

Of course, it is very difficult in the midst of a transition period such as this is to determine accurately the new conditions under which we shall have to work. There is also a strong tendency to run along accepted lines in any such complicated field of activities as modern building has become. We are reluctant to leave the anchorage of experience to which we may have navigated ourselves with much pains, and nothing short of this general upheaval would have made possible changes that are happening in an almost revolutionary way.

Generally, it seems not at all unlikely that we shall revert in a measure to older methods still than those obtaining in immediately pre-war days. In fact, the era to which the war put a period was not one that is likely to be looked back upon with much pride. Little attention was paid, for instance, to the fullest possible use of local materials in the design and erection of buildings. Imported timber, bricks, slates, stone and fittings were gathered together from the ends of the country, and, such was our weird economic system, often at a considerable advantage over local prices. The increased cost of transportation will tend to readjust this anomaly somewhat in the future. Timber, employed upon anything like a pre-war scale, we can count out; its use will be restricted to joinery and essential fittings. On the other hand, worked metal should be easy to obtain, in view of the multifarious munition factories and plants that will be available for the arts of peace, and we shall doubtless find such matters as the stone mullion and metal casement coming again into general favor economically as well as artistically.

An idea was propounded some time ago for paneling doors with sheet asbestos as another means of economizing timber. The use of concrete for floors both up and down (referred to before) and finished off with some jointless composition is likely to be followed widely.

Concrete roofs, either flat or pitched, are yet another possibility, and the latter in certain cases where expense is not a prime consideration may possibly be covered with slates or tiles. In the country, cottage roofs will be covered with asphalt sheeting or some similar material, and so save weight of timber otherwise necessary for slates or tiles.

Partitions can be economically and simply erected in plaster slabs. A deal of external timber in fascias, barge boards, sham half-timber framing, architraves, etc., can be dispensed with without detriment to the design.

Lead, again, is an expensive commodity, and was considerably appreciating in cost before the war. However useful this ductile metal is for gutters, flashings, dormer coverings, and so on, its employment will have to be restricted and cement or sheet asphalt substituted wherever possible.

In fact, summing up the position, cement and metal are going to play the parts of the principal constructive agents of the immediate future, used in conjunction with the basic local material, brick or stone; at any rate, as far as the shells of our buildings are concerned. These materials will be easily procurable, and their handling is simple, and after we get over the difficult process of revising our ideas there should still be plenty of scope left for the craftsman in the fitting up and external adornment of our buildings. His work, indeed, may show up even better for the severity of its future setting.—*London Carpenter and Builder.*

New Publications

Managing a Business in War Time. In two volumes.—Recent legislation and the growing tendency of the public to consider that a business should not exist unless it serves the nation adequately constitute a warning to the business man, for it is acutely necessary to adjust business to war time needs and economy. When incompetence or abuse of any sort are left in private business until the public discovers it, radical remedies are invited which are often hardly less harmful than the evils they seek to correct.

These two books are intended to aid in meeting war conditions that have arisen or are likely to arise in the future. They are based on sound business policy, and relate how unfavorable war conditions have been dealt with abroad. As we are likely to meet with the same conditions here in the United States, the experiences of our Allies business men in this respect are likely to prove valuable.

The two books are a collection of short articles from various writers. They give pertinent hints that will enable a man to better adjust his business to war time conditions, and show him methods which have won success abroad. The probable effect of the war upon prices is forecasted, and an effort is made to show how the war will affect business.

The books are likely to prove valuable to the man who is interested in securing better knowledge of the subject of business in war time, with a view to adopting his own business so as to make it run as efficiently and economically as is possible under the changed conditions which now confront us. The two books contain about 600 pages, size 5¼ x 8½, are bound in cloth, sell for $3 and are published by the A. W. Shaw Company.

Modern Management Applied to Construction. By Daniel J. Hauer. Much of any success that may be obtained by the building contractor is due to the efficiency of his organization. If his men know how to work a little bit better and a little bit quicker than those employed by a competitor, then he can underbid the competitor every time or make a greater profit on the same bid.

This book is devoted to telling how the contractor can teach his organization to work quicker and more efficiently. Its ideas are interesting and backed up by the principles of scientific management.

For instance, take the simple operation of shoveling dirt. The author points out that a shovel taking a 21-lb. load is best suited to the work, and he describes how it should be handled so as to easily permit of more work being done in a given time. He shows that of five average laborers watched, only one shoveled correctly. This man handled three shovelfuls a minute more than any of the other four. There is other worthwhile material like this in the book.

In addition, the book explains the principles of scientific management, and gives points on planning construction jobs, routing work, systematizing construction, etc. There is much valuable material that the thoughtful contractor can put into immediate practical use in perfecting his organization.

The book sells for $2.50, contains 194 pages, size 6 x 9 in., is illustrated by diagrams, etc., is bound in cloth, and is published by the McGraw-Hill Book Co.

How an Experienced Dealer Handles the Commission Practice

By the Old Retailer

When the Old Retailer began to discuss the relations between the Retailer and the Building Contractor he was well aware of there being so many angles to the subject that it was almost impossible to cover in detail every variety of experience in this regard. This is so large a country, and the conditions so varied and different, that anything said which might apply in some sections would in others be criticized as impracticable, which is the usual and common thing to do by those who are hidebound by custom. Custom makes comrades of us all and, rather than fight for a change, we condemn the proposition as impractical for us, and so we continue to follow a policy that we know is inherently wrong, but which we have not the courage to break away from. There would never be any reforms made if the majority of folks had their way about it, and therefore the few who attempt them must expect more or less adverse criticism.

The Old Retailer Has Had Long Experience

The Old Retailer has been in the retail game for over thirty years. Previous to this he served a regular apprenticeship in learning the trade of a carpenter and joiner; worked for a while as a journeyman and later on developed as a contractor. During the nine years he worked at the construction business, he made diligent study of the technical part of the business also and afterward when he became a retailer and was handling the different kinds of building materials he made it a point to learn all he could of them so as to be able to figure quantities and sell them intelligently. His experience in running a yard has been both in the large city and country town, which means that he has had to deal exclusively with contractors in the one place; in the other, a combination of buyers in the form of farmers, townspeople, carpenters, contractors, and the man who does his own work. This includes too the tradesmen who worked in the several branches of building construction.

The Old Boy has given you these few personal items about himself so his readers may know that what he has written in this department is based on his own personal knowledge from experience. If he has vision, he is not visionary concerning those things which he sees developing from the apparent trend of movements in the retailing of building materials. He knows that human relations change with developing conditions, and conditions very often change faster than men do. With this attitude his state of mind is always receptive and is never afraid of a new idea when he meets it.

A correspondent in the last issue of this paper says the Old Retailer has not said a word about a proposition that almost all country lumbermen have to deal with, namely, "the crime of paying commissions to carpenters," which, as he thinks, "is by far a worse feature to cope with than the matter of allowing discounts," and he wants to know how the O. R. "dealt with this commission pest." In the November issue of this paper, which he speaks of, the Old Retailer has this to say on the subject: "The day-working carpenters and other mechanics who take small jobs when work is not plentiful should be charged the same prices as anybody else. It is a mistaken policy to give these men a "rake off," because almost every carpenter becomes at times a contractor, and in order to get work will oblige the better class of contractors to compete with prices that are too low for the work. As a consequence the town will have a lot of men fighting to get business without profit, either to them or to the dealers."

This is a condition that exists in every country town when work is plentiful. The better class of workmen are contractors either to do the work and furnish the materials or only to furnish the labor. When work is scarce the contractors are willing to do a day's work when they can get it.

City Dealers Do Business Mostly With Contractors

In the cities when there is no country trade and trades unions are in control, the building material man has to deal almost exclusively with contractors. But as conditions in this respect are different in the country towns, the dealer has to differentiate between those who make contracting a regular business and those who generally work by the day. If he does not, he should do it in the matter of giving discounts. Now, as a matter of fact, a commission as is understood in this connection is practically the same as a discount, but with this difference: you give the contractor a discount for prompt payments because you want the use of the money, but you give the carpenter a commission as a bribe to get his trade. This as a business proposition is radically wrong and a submitting to an unjust imposition. Furthermore, as a matter of fairness and justice to the consumer there should be neither discount nor commission allowed to either contractor or carpenter, for the consumer is the one that pays for it in the end. If discounts are to be given at all, they should be given only for cash sales. One price to all, and the same discount to all, is a policy that should be followed in the retail building material business, although this is a contradiction of the old-stabilized idea that quantity business affects prices and discounts, and long-established custom has so ingrained this idea with buyers and sellers that it has the effect of a statutory law.

The selling of building materials at retail has always been governed by a competition in prices. Quantities comprising several units are sold for a lump sum, and practically to the lowest bidder.

Dealers at Fault Through Their Varying Views

Uniform prices for the units in material bills are seldom used by the dealers competing to sell them, and the buying public has become educated to want and expect this kind of competition. There is not a dealer but what knows this way of selling materials is fundamentally wrong. His sense of justice tells him that it is unfair to sell one man at a lower price than another because of competition but, whether he feels this way or not, established usage and conditions practically compel him to do what others are doing. Therefore it is logical to say that the retail dealers are themselves at fault because of their continuing on in this system of price competition.

The business world is awakening to the defects of this policy of selling. Some of the most progressive lumber dealers have not only seen this but they have had the courage to establish the policy of one price, and the same price to all. They are successful in carrying it out without any serious difficulty.

The foregoing are the ideas of the Old Retailer of what should be. Now he will discuss about things as they are, and more especially conditions concerning the lumber yard in a country town.

Country Dealers Do Business With Born Dickerers

The class of people whom a country dealer has to deal with are largely made up of those whose ideas of trading are the primitive ones of bargain and dicker and to get all they can from the seller for the price paid, such means as trickery being considered legitimate in obtaining this.

The seller in turn is actuated by similar motives and influenced by the competition of the fellow in the other yard. He is willing to cut his own price to make the sale and will do this several times on the same bill if necessary. In

other words, he has now established a price of his own. Prices for his goods fluctuate according to what he is offered by the customer and what his competitor's prices are. In addition to this and in consideration for the buyer's patronage and future trade he will give him such time to pay for the purchase as will suit his convenience. The regular customer of the yard views this in the sense of an obligation the dealer owes him and strange to say, the dealer himself insensibly is drawn to look at it in the same way.

The giving of time credit is another means the dealer uses to bid for trade, and many dealers think this to be a cheaper way than the cutting of prices.

Conditions Reversed When Dealer Buys

In buying anything from the farmer who is not forced by circumstances to sell at the time, the dealer finds this way is reversed. In this regard the farmer is a better business man than he. There is no such thing as cutting of prices or time business with him. It is cash on delivery. The farmer has no competition to influence him in selling, nor will he offer an inducement to effect the sale. This is the stereotyped attitude of the farmer toward the dealers in merchandise in the town that is his trading place. When it comes to buying what he wants from other parties in distant places he considers it a different proposition. He realizes they don't "know him" as the home town merchants do, and because of this he thinks they ought to trust him. Therefore he is amenable to do business as they say he must and willingly conforms to their terms and conditions. He will even buy lumber from these parties "sight unseen," but you couldn't get him to buy a bill of lumber at the local yard without his seeing the stuff he is going to get. Yes, and besides this he will even send the money early to pay for his purchase in advance. Without the inducement of a discount either.

All of this goes to show that the farmer is perfectly willing to do business on the other party's terms if he knows he cannot do otherwise. Does it not also show that it is all the fault of the local merchants that he has been educated by them to consider that dealing at home is a different proposition to what it is in doing business with outside parties?

The country lumber yard has a class of customers that have always acted the role of middlemen between the dealer and the trade. It would be hard to estimate the percentage, but it is safe to say that the great majority of people, when they want to build or make any improvements, consult first the contractor or carpenter or the mason plasterer, painter, according as is the kind of work they want done. They don't think of the man who sells the goods they want to use. They assume that he knows nothing of assembling them for a job and putting them together. His is a business of selling materials and theirs a business of using them in construction.

If a man wants a little job done, he gets the carpenter or other tradesmen, tells them what he wants done, the workman figures the cost and lets the farmer know what he'll do it for. Perhaps the farmer will get two parties to figure on it, and the lowest bidder obtains the job, this being the customary way of doing.

The building mechanics here come to believe that they have an active influence on the trade of the yard they deal with. This idea is furthermore encouraged by the dealers themselves, for they show their dependence on the carpenters by asking them about prospects for building, and to bring the parties round to figure with them. The carpenters know by this that they are important factors in securing business for the yard, and there is no denying the fact of their being able to influence the man who has come either to consult them or to employ them to do the work, to buy his materials of the dealer they choose to send him to. This state of mind of the carpenters tends to give them an inflated idea of their importance to the dealer out of all proportion to the real value of it. It's not an uncommon thing for the more ambitious and "cheeky" among them to let the dealer know that if he expects them to turn business to his yard he will have to pay them for it in the form of a commission (bribe) on whatever sales are made by reason of their assistance. A feature of this proposition is that he assumes to be the sole judge of the extent of his influence in making the sale. The status of the dealer and his salesmanship is ignored and goes for nothing.

How to Avoid the Trouble

There is no more vicious proposition in the whole range of retailing building materials than this, and the lumber dealer who makes a practice of submitting to "hold up" carpenters has only himself to blame. Conditions of the situation have nothing to do with it because he himself by his weakness creates such conditions. The excuse that his competitor does it is no reason at all why he should. In fact, his abstaining from it gives him a strong point of advantage over them, for he can take the public into his confidence through the advertising medium of the local paper and tell people that his prices do not include the cost of commissions paid to the parties for getting him business. This will set folks to talking, and it is likely they will come to him for an explanation. When people get the idea that the carpenters are getting a "rake off" on their money paid to the lumberman they'll be pretty apt to look out for this the next time they hire a carpenter.

This is the most effectual way of eliminating this form of competition. It will also knock in the head the practice of the mail order houses as far as this community is concerned. We all know that these concerns obtain a list of the contractors and carpenters in every community in the country and play upon their prejudices and greed by offering them commissions on all the bills they can persuade the owners to buy from them. As a general thing, however, about all the patronage they receive from this source is from the small class of carpenters who have a grievance against the dealer because he won't indulge them in running long-winded accounts on his work. The real harm from it is that as all the carpenters receive this offer it tempts them to use it as a club over the dealer to force him to give them special favors of this kind, but none but a weak-kneed dealer will submit to it.

The Old Retailer has been asked to give his experiences in dealing with this commission pest. The answer to this is very brief. He never had any, but this is not saying that it has not been hinted to him by carpenters they would like a perquisite of this kind for their influence. But he sat down on such a proposition from the very first and gave them to distinctly understand there was nothing doing in that regard. The number who made the suggestion were very few, and those he told them he didn't care for their trade if he had to get it that way.

He Always Played Fair

In dealing with carpenters and other mechanics he always considered that in selling them on their credit and carrying them till they were able to collect from their small jobs he was giving them as much as he received from them. His contractors who gave him all their business without figuring elsewhere he favored with a list that was a little below the regular prices. In cases where the competition for a job was strong he backed the contractors up sufficiently to land it if possible.

Another thing, he never flirted with every contractor to get his business. His policy was to tie up with some competent and reliable contractor and establish a co-operation that was of mutual benefit to both. This was his policy in his country yard experience.

In the city yard he figured with all that came, but did not figure for keeps with those that were unreliable. His observation has been that where you do business with this class of men you may keep even with them for a time, but in the end they will stick you.

In dealing with the small jobbing carpenters in the city trade he selected a few with a good reputation for honesty and capability and gave them a limited credit, and it was understood also that they were not to take a job without his looking up the credit rating of the owner. All materials for jobs were to be paid for when the job was done and money collected. As this class of work was in the main non-competitive it was more profitable than selling the larger bills.

The lumber dealer who depends on bribing and cutting prices generally to get business may make a go of it for a time, but if he doesn't change his methods in this respect he is on the way to the Junk Pile, for this way of running a lumber yard is fast becoming obsolete.

But this is the only opinion of The Old Retailer.

New Catalogs of Interest to the Trade

Modern Furnace Heating. The Hess Warming & Ventilating Co., 1201-L Tacoma Building, Chicago, Ill. Illustrated handbook containing a description of steel furnaces, pipeless furnaces and circulating-room heaters.

Condit Electrical Protective Devices. Condit Electrical Mfg. Company, Boston, Mass. Describes various types of oil switches and circuit breakers and also instructive advice on "The Control and Protection of Small Induction Motors."

Carpenter's New Gravity Roller Hinge. R. F. Carpenter Mfg. Company, 978 East Sixty-fourth Street, Cleveland, Ohio. Describes a springless type of hinge for swing doors, operated on the principle of replacing spring action by gravity action.

Clay Working Machinery. The American Clay Machinery Co., Bucyrus, Ohio. Is a veritable encyclopedia of clay-working machinery. This catalog, 440 pages, bound in boards, will not be sent indiscriminately but will be sent only to contractors who find special use for it.

Double Andes Coal and Gas Range. Phillips & Clark Stove Company, Inc., Geneva, N. Y. Describes and illustrates a new combination stove for all fuels.

Beaver Board in Farm Buildings. The Beaver Board Company, 59 Beaver Road, Buffalo, N. Y. Describes artistic applications of this material in this class of building.

Build a Concrete Storage Cellar. Portland Cement Association, 111 West Washington Street, Chicago, Ill. Construction details on suggested plans for concrete storage cellars are shown. By illustrations of vegetables stored in concrete cellars and common house cellars, this pamphlet shows the advantages of a concrete storage cellar.

Concrete Tanks for Oil Conservation. Portland Cement Association, 111 West Washington Street, Chicago, Ill. Describes and illustrates various types of concrete oil tanks.

Concrete Ships, 1849-1918. Portland Cement Association, 111 West Washington Street, Chicago, Ill. Booklet which by its illustrations and text traces the origin of concrete ships from their birth as a reinforced rowboat in 1849 to the present 10,000-ton freighters.

Curtis Service. Curtis Lumber & Millwork Company, Clinton, Iowa. June issue. Feature is photographs illustrating the evolution of home building.

Rex Products. The Flintkote Mfg. Company, 98 Pearl Street, Boston, Mass. Describes and illustrates roofings and shingles, which are two of the products marketed by this company.

Atwood Vacuum Cleaner. Atwood Vacuum Machine Company, Rockford, Ill. Catalog describing and illustrating stationary plants for homes, hotels, hospitals, apartment and office buildings. Describes the various features of the Atwood machine and contains photographs of hotels and buildings in which Atwood machines are installed.

The Carter Times. Carter White Lead Company, Chicago, Ill. Interior decorating number. Contains interesting and timely illustrations and text on how to beautify your house.

As a Man Liveth. Associated Metal Lath Manufacturers, Cleveland, Ohio. "As a Man Liveth So Shall He Work" is the text of this industrial housing book, which is a discussion on this subject. Contains photographs and plans of some of its operations.

Vitrolite, Better Than Marble. The Vitrolite Company, Parkersburg, W. Va., shows the varied uses of vitrolite in hospitals, toilet partitions and wainscoting.

Any of these catalogs will be furnished by the manufacturers. Or, if you prefer, we will see that you receive any that you desire. Just check the catalogs you want, tear out the page, and mail it to Building Age, 243 West 39th Street, New York.

Nonpareil Insulating Brick for Furnaces and Ovens. Armstrong Cork & Insulation Co., Pittsburgh, Pa., discusses merits of this product and its coal saving.

Making the Coal Bin a Safe Investment. The Milwaukee-Western Fuel Co., Milwaukee, Wis. The importance of efficiency and service in coal delivery is discussed; the necessity of having sufficient storage capacity for coal, the need of speedy and facile deliveries from dock or yard into the cellar, are all taken up in their relation to the methods shown of making the coal bin efficient.

Red Lead Saves. National Lead Company, New York City. The conservation and general economy effected by the use of red lead forms the subject of discussion in this pamphlet. Pictorial representation is given of the many fields in which red lead may be used to save, and facts are presented as to how this product may be used to accomplish the greatest conservation of building materials.

Concrete in Architecture and Engineering. Portland Cement Association, 111 West Washington St., Chicago, Ill. The title illustrates the text of the August number, which is dedicated to better industrial housing.

Registers "H & C." The Hart & Cooley Co., New Britain, Conn. Booklet shows manufacture of wrought steel floor registers, side wall and baseboard registers, ventilators and furnace regulators. The newest types manufactured by this company are shown.

Permanent Homes for Workmen. Lambie Concrete House Corp., 52 State Street, Boston, Mass. Illustrated booklet, discusses advantages of concrete in industrial housing. Contains plans and photographs of "Lambie" industrial housing operations.

Myers Door Hangers. F. E. Myers & Bro., Ashland, Ohio. Interesting catalog illustrating door hangers, especially adapted for barns, garages, warehouses and factory doors. Various types are shown, from the plain flat track unadjustable hanger to the covered weatherproof adjustable hanger.

Sylphon Air Valve. Fulton Company, Knoxville, Tenn. Describes the new valve manufactured by this company and its use in water heaters, boilers and automobile motors.

Hill's Dry-Cold Refrigerators for Store and Market Fixtures. C. V. Hill & Co., Trenton, N. J. Illustrates and describes sanitary refrigerators for hotels, restaurants, institutions, residences, clubs, hospitals, markets and general storage purposes. Also photographs of market fixtures manufactured by this company.

Zinc in Paint. New Jersey Zinc Co., 55 Wall Street, New York City. Booklet takes up the value of zinc in painting farm buildings, silos, tin roofs, concrete and plaster, boats, hulls, etc.

Announcement to Truck Dealers. All American Truck Co., Chicago, Ill. Contains photographs of the "All-American" one-ton truck and the personnel of this firm.

Reflectolyte, Make Day of Night. The Reflectolyte Co., St. Louis, Mo. Describes new system of lighting for the purpose of illuminating public, private and industrial institutions. Also contains interesting engineering data on lighting.

The Concrete Builder. Portland Cement Association, 111 West Washington St., Chicago, Ill. Enters into a discussion on "necessary building" and describes and illustrates necessary concrete form buildings, silos and tanks. Contains plans and details of design for concrete cattle dipping vat and milk-house.

The Rotsaert Border Mitering Jig. Med. J. E. Rotsaert, Portland, Ore. Describes this miter by which different lengths of rule, border, moulding or other material can be mitered in one and the same cut of saw.

Ornamental Ideas. National Manufacturing Co., Sterling, Ill. Booklet illustrates and describes ornamental surface hinges and cupboard butts of most beautiful design. Discusses also the advantages of the ornamental butt.

Aero Automatic Fire Alarm. Aero Fire Alarm Co., 26 Cortland Street, New York City. Booklet illustrates copper tube which is a tested fire finder. Contains interesting data on its workings and testimonials from some of its successful users.

A Feature of Vital Importance in Industrial Housing

Hanging the doors properly is a matter to be considered seriously by builders of industrial houses. Needless to say, durability is a prime requisite in a house built for the laboring classes. The doors are subject to more wear and tear and must be properly constructed.

Consider the butts and hinges first.

No. 450

Half Surface Butt

This Butt has proved popular with builders working on housing projects as they have found that **they save at least one-half the time required to hang the doors.**

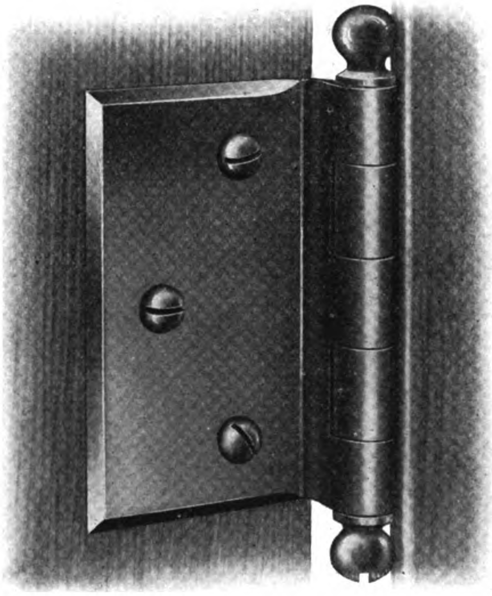
If you are contracting for such work, time is the all-important issue, as you may be figuring close and time is money.

Made of selected cold rolled steel, highly polished, double-plated, with beveled edges.

Tapped at both ends, making it reversible.

The false tip is threaded and screws into the Butt. It is also slotted for a screw-driver, making it easy to remove the tip and affording ready access to the pin.

The slot also indicates which is the bottom of the Butt—a very popular feature with carpenters and builders.



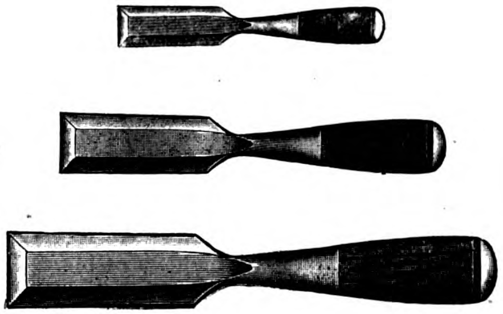
Cut full size of 2½-inch.

This design matches very nicely the escutcheon plates with beveled edges, giving a very harmonious effect.

One pair in a carton each Butt wrapped separately with screws. Any finish desired. Made in the following sizes: 1½″, 2″, 2½″, 3″, 3½″, 4″ and 4½″.

National Mfg. Co. **Sterling, Illinois**

Stanley Tools



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Strongest, Fastest, Most Durable Chisels Manufactured

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Exceptionally well made and highly finished.

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Special circular upon request

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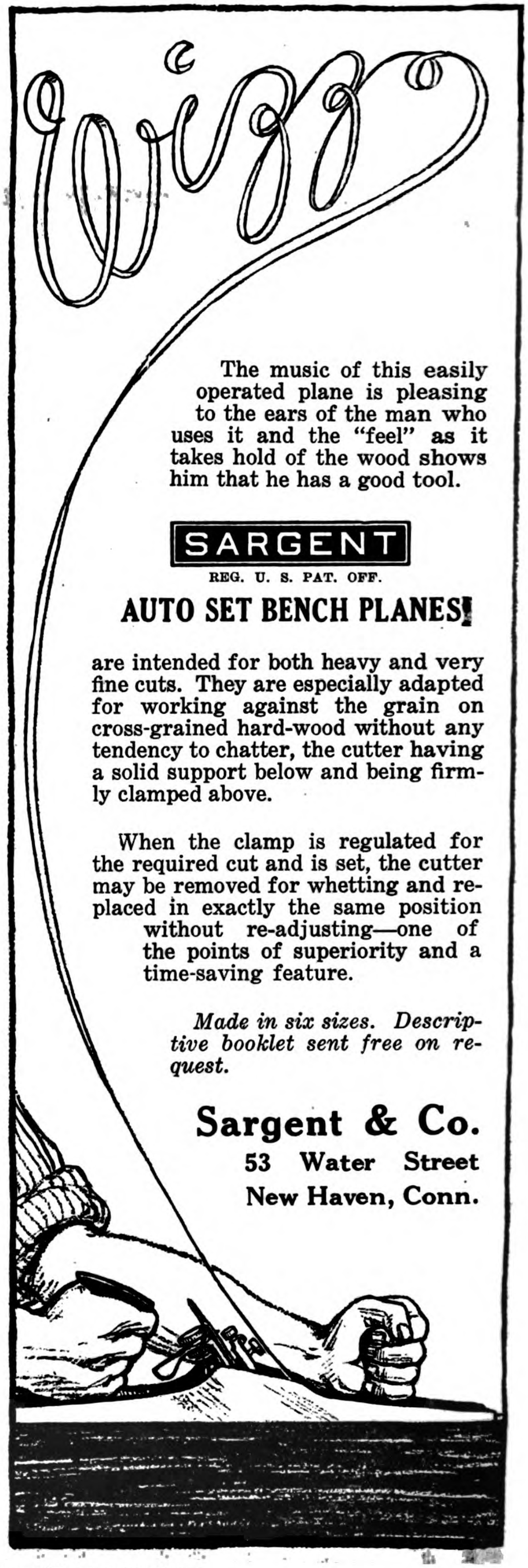

The music of this easily operated plane is pleasing to the ears of the man who uses it and the "feel" as it takes hold of the wood shows him that he has a good tool.

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AUTO SET BENCH PLANES

are intended for both heavy and very fine cuts. They are especially adapted for working against the grain on cross-grained hard-wood without any tendency to chatter, the cutter having a solid support below and being firmly clamped above.

When the clamp is regulated for the required cut and is set, the cutter may be removed for whetting and replaced in exactly the same position without re-adjusting—one of the points of superiority and a time-saving feature.

Made in six sizes. Descriptive booklet sent free on request.

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IMPERISHABLE STUCCO

REDUCE CONSTRUCTION COST

While lumber, cement, brick and nearly all other building materials have increased materially in price, yet Kellastone, the most permanent stucco material in existence, has advanced less than 8% in the last three years. Therefore by comparison Kellastone Stucco is lowest in construction cost.

More buildings are needed everywhere. Don't wait to pay higher prices, but build now and save money.

KELLASTONE
IMPERISHABLE STUCCO

will keep down the cost, guarantee the permanence of your building, produce the highest standard of beauty.

Kellastone Imperishable Stucco works like magic in transforming old frame buildings into handsome, enduring edifices at small cost.

Write for booklet that tells the story of this wonderful, crackproof, fireproof, coldproof, heatproof and strainproof stucco that is only equaled by marble or granite. Let us tell you where you can see and inspect a Kellastone building nearest your vicinity.

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This Chopper has a tool steel edge and will last a life time.

Write for description and prices.

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C. E. Jennings ARROW HEAD Expansive Bit
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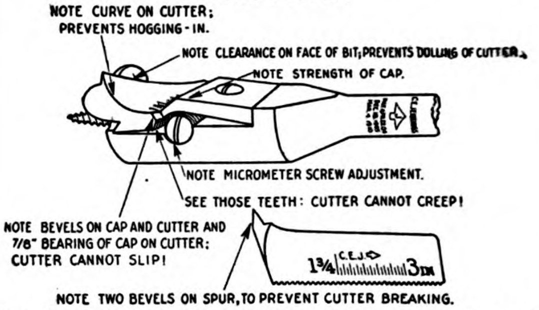

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Something For You

in our Pamphlet 29; viz.:

Valuable Tables for finding size of joist, safe load of joist, actual load on hanger, etc., etc.

Some of these Tables are not in print elsewhere.

The Pamphlet and the Mounted Model Hanger will be mailed on request.

SOMETHING FOR US. We ask your special attention to items 5, 6, 7 on page 5 of the Pamphlet and to the matter on pages 23 and 24 relating thereto.

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ORIGINATORS OF SASH CHAIN

The Standard for over 35 Years Capacity of chain plant 35 miles per day. Many imitators, no equal. Used by the United States Government for over 30 Years.

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cost less than cords, pulleys and weights, last longer, are neater in appearance, and a carpenter can install twice as many per day.

OVER FIVE MILLION IN USE

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COPPER CABLE
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For Suspending Heavy Doors Gates, Etc.

All of SUPERIOR QUALITY

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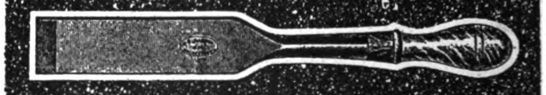

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There is some mighty interesting and profitable reading in "The Carpenter's Catalog" and "True Stories." Both free, of course.

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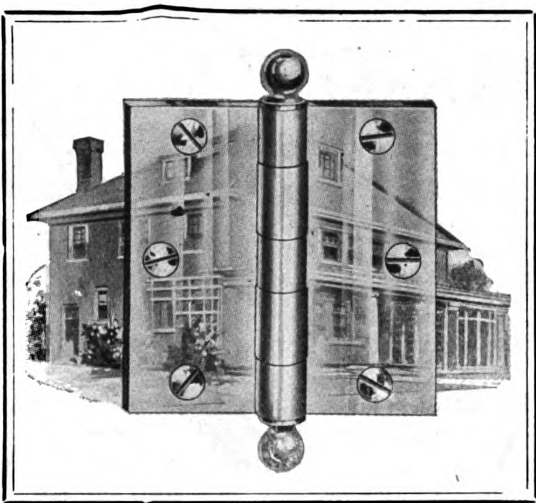

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ATTENTION!!

is called to the hinges on the door. To some people door hinges may seem rather small and unimportant—nevertheless, their mission in helping to make or mar the appearance of the rooms in a modern home is worthy of serious thought. The

GRIFFIN
"The Door Butt of America"

is designed along lines that insure both *beauty* to the home and *service* whenever the doors are opened and closed.

The Griffin operates freely and easily, it is amply strong for heavy doors and it is such a pleasing fixture that architects and home builders are glad to specify and use it.

Being finished in the various Griffin hardware finishes, it is in wide demand for the better class of houses and office buildings.

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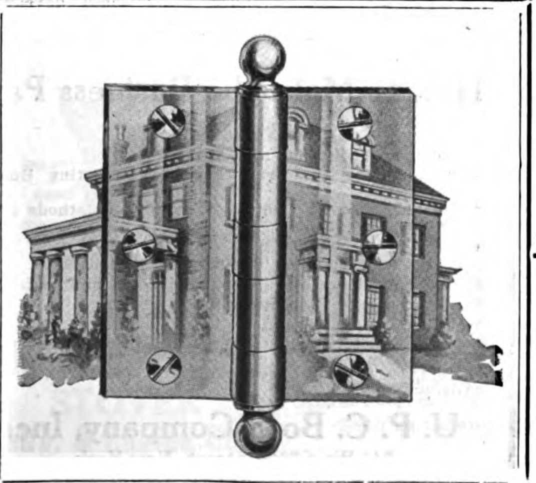

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This Starrett scraper, No. 194, has eight cutting edges; any one is easily brought into use by means of the handle with its special ball bearing joint connection. Gives any desired angle—handy for corners. A tool strictly Starrett quality.

Catalog No. 21 P sent free, shows 2100 other styles and sizes of Starrett Tools.

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The World's Greatest Toolmakers
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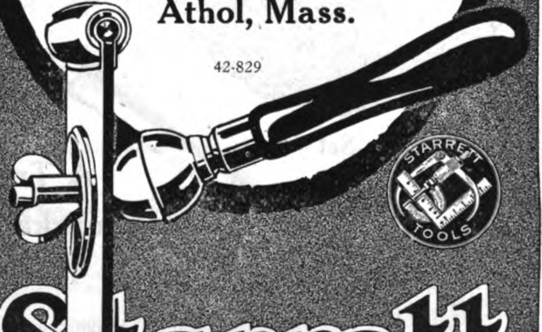

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R-W No. 643 Swing Door Closer and Check

Patented

Stands Ace High With Builders and Building Owners

Because—

Scientifically adapted to its purpose.
Spring cannot be overwound.
Adapted to right or left hand swing doors.
Simple and effective spring adjustment.
Made in six sizes for various weights of doors.

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Richards-Wilcox Canadian Co. Ltd. London, Ont.
"A hanger for any door that slides"

PHILADELPHIA
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Plain Screw Drivers

STANDARD No. 90
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They cannot loosen in the handle, in use or abuse.

You have our Guarantee.

They are durable as the high grade steel that composes them, and will render faithful service for generations. The comfortable handle and various lengths of blade make them suitable for all classes of work.

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A Complete Set of Tools in One

A Truly Remarkable Tool

for smooth, round, oval or square boring, scroll and twist work. Takes but little practice to put this tool to many varied uses such as core boxes, fine and delicate patterns, veneers, screen work, scalloping fancy twist columns, newels, ribbon molding and mortising. Just the thing for cabinet makers, carpenters and woodworkers.

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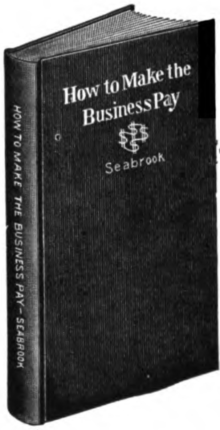

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Shows Methods That Succeed

Shows you how to get the most out of your business ability. Explains how wrong methods are rebuilt into money making methods. Suggests many new avenues of business development, with plans and ideas for immediate use.

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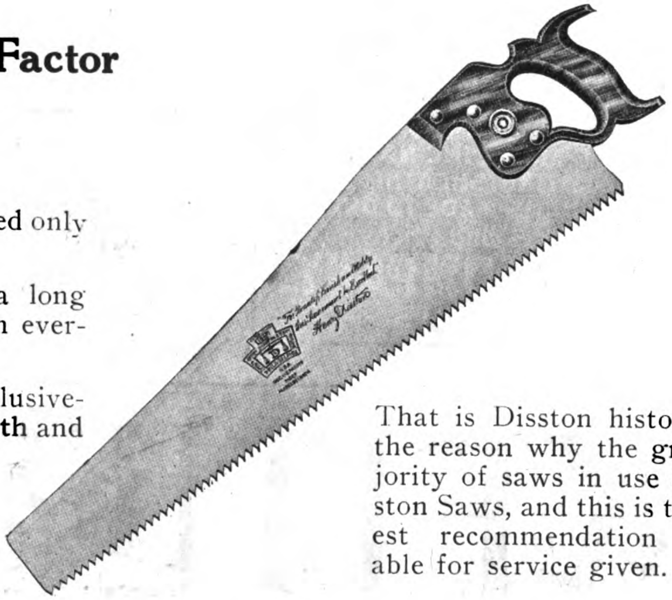

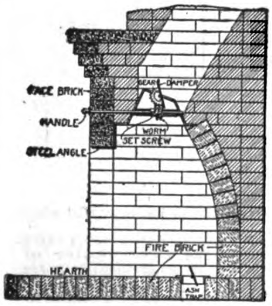
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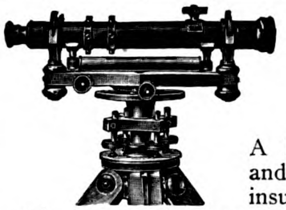

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"ZINCLAD" CUT AND WIRE NAILS
FOR WOOD, ASPHALT AND ASBESTOS SHINGLES
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HERO PIPELESS FURNACES

Contractors and jobbers should investigate the big business to be secured by selling and installing these unequalled fuel savers. Installed in a day. In demand everywhere.

Big commissions and exclusive territory. Write for bulletin.

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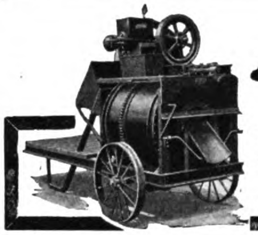

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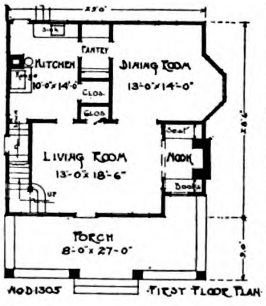

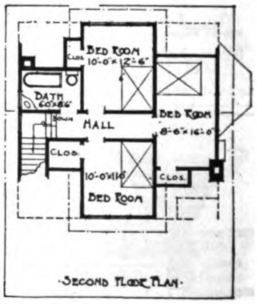

You can build beautiful homes like these just as easily as the ordinary kind, and if you put character into your work, the business will come to **you.**

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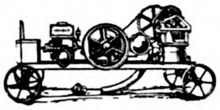

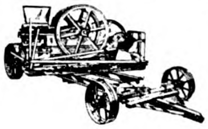

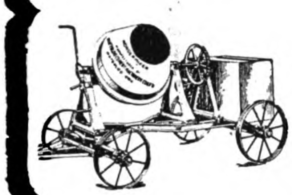

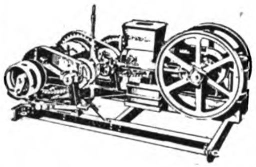

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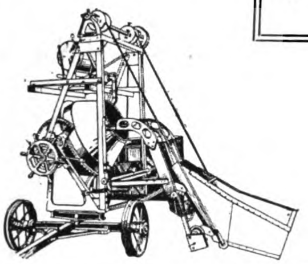

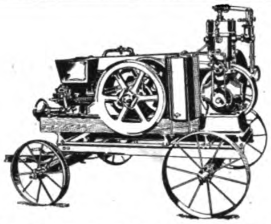

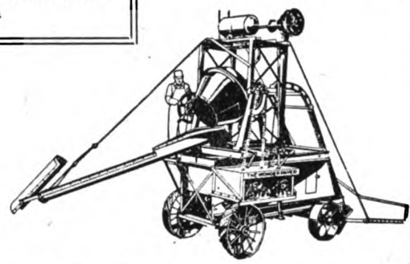

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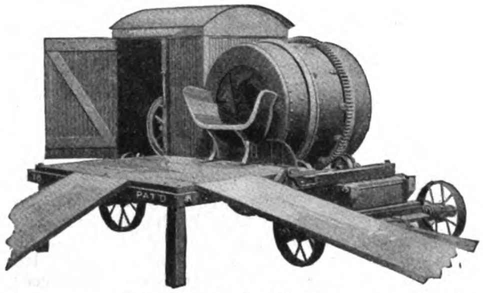

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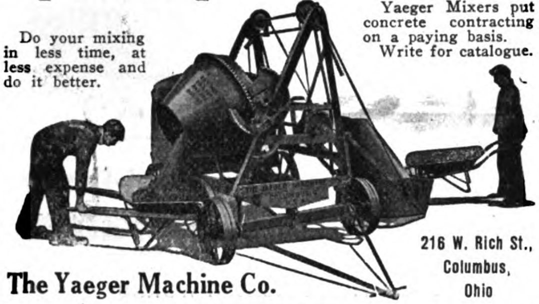

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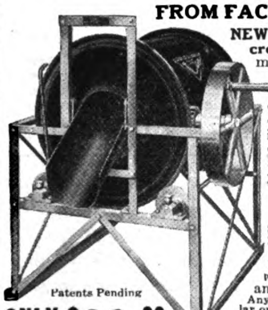

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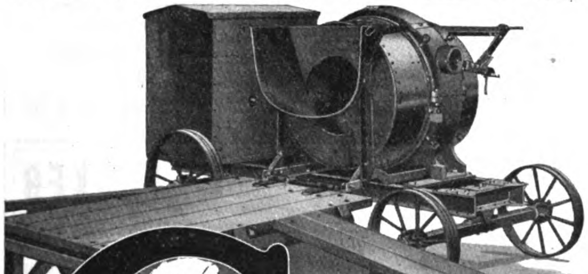

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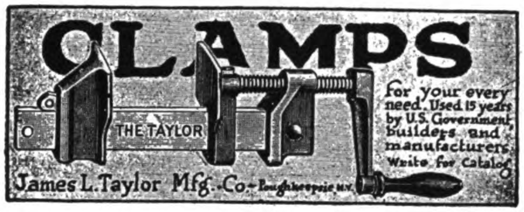

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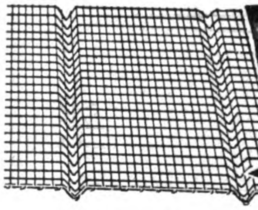

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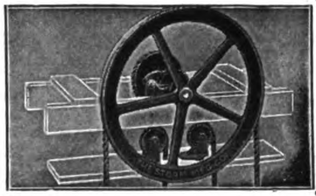

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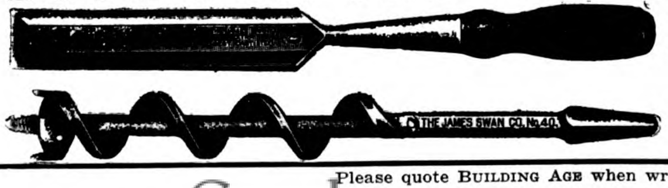

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BUILDING AGE

New York, October, 1918

An Attractive and Well Planned Stucco House

A house built for comfort may be very simple in design and yet, if it carries an air of being homelike and cheerful, prove as attractive as any in its community. A carefully planned exterior color scheme will help to make a place attractive, having, in fact, as much importance as almost any other phase of exterior design. How many of us have not seen houses which we had always thought unattractive made beautiful by proper painting and refurnishing. And how grateful we are to the architect or builder when he provides an external color scheme which is beautiful.

The Rear of the House Is Designed to Give the Maximum Amount of Room Inside.

This is the case in the house illustrated herewith. The color scheme is very simple, but it is so well suited to the architecture of the house that it seems quite perfect in its way. The walls are of stucco in warm gray tones, blending into the roof which is stained a grass green. The walls are relieved by the white painted sash, eaves and other trim, and by the vines and shrubbery which grow about the house.

The lines of the house are very good; the long slope at the front is relieved by a dormer, while the shorter slope at the rear is intercepted by the hipped roof which covers the bedroom and sleeping porch at the extreme rear of the house. At the second floor line there is still another roof projection, lending unusual interest to that view of the house, as may be noticed from the photograph of the rear. Such features as the window bay at the left side of the house and the cobblestone chimney, which is exposed its full length, give an added interest, the result being an unusual and distinctive dwelling.

Turning to the plans, it will be observed that these qualities persist in the interior as well as the exterior. And yet the livableness of the house is its greatest charm. A long veranda runs the full length of the front of the house.

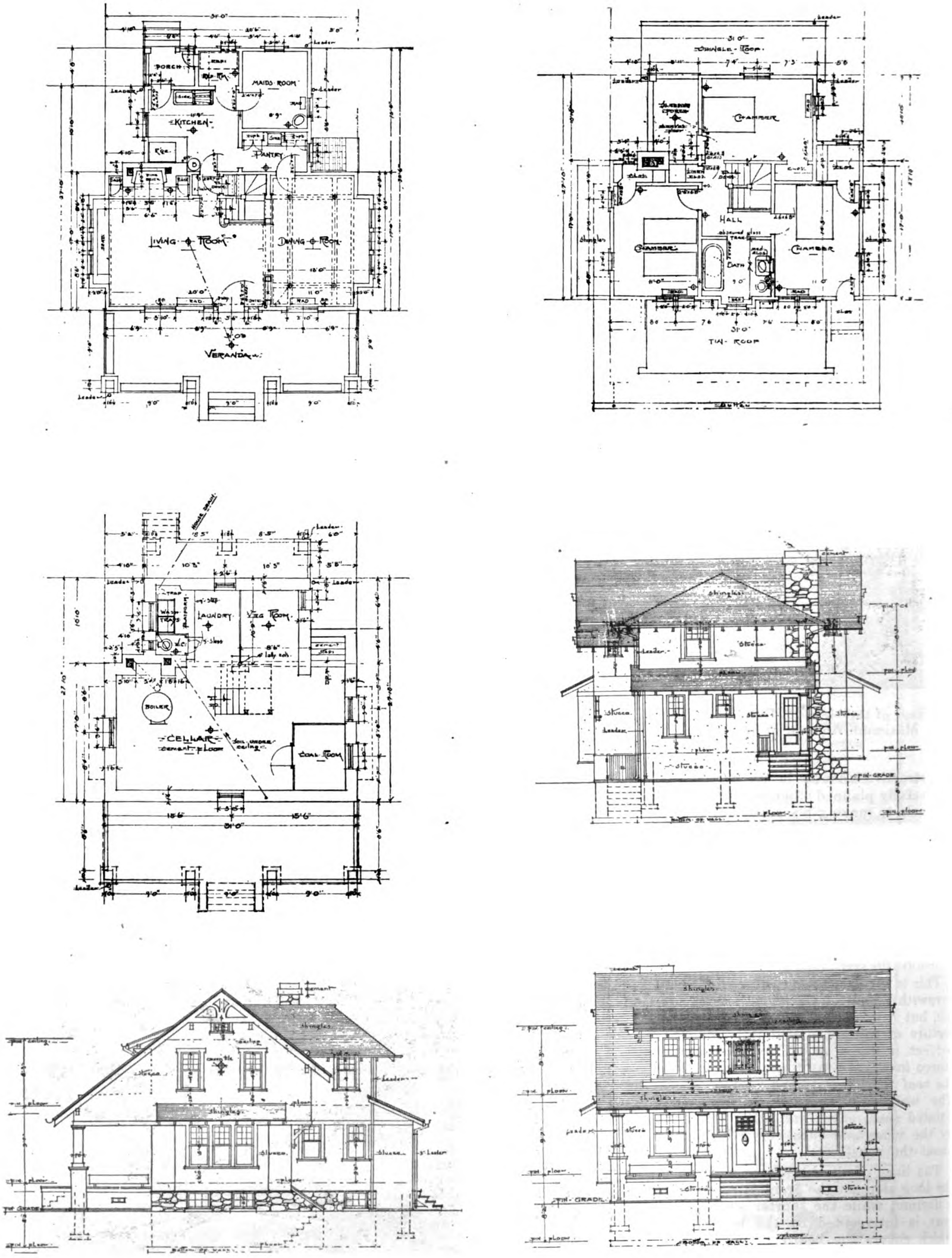
The living room opens upon this porch, and immediately upon entrance the eye is taken by the cheerful fireplace on the opposite side of the room. A glance at the interior details will show the design and construction of this fireplace, which is of cobblestones, the same as the exterior of the chimney. There is a 5 in. cement shelf, and a setback of the cobblestones, emphasized by a heavy key stone arch. This stone construction runs to the ceiling, breaking into the picture, molding at this point.

The Long, Sweeping Roof Is Gracefully Handled.

The left wall of the living room is taken up with a large bay, having a built-in seat. This is a very cozy spot, commanding as it does, a view of the fireplace, the stairway and the dining room, to say nothing of the view out of doors.

The wide, open doorway into the dining room reveals a similar bay on the far side of that room, giving it unusual light and airiness. The dining room has a beamed ceiling, the beaming serving to emphasize the interesting irregularities of the plan.

Square Wood Columns Form an Interesting Contrast to the Grey Stucco and Green Roof.

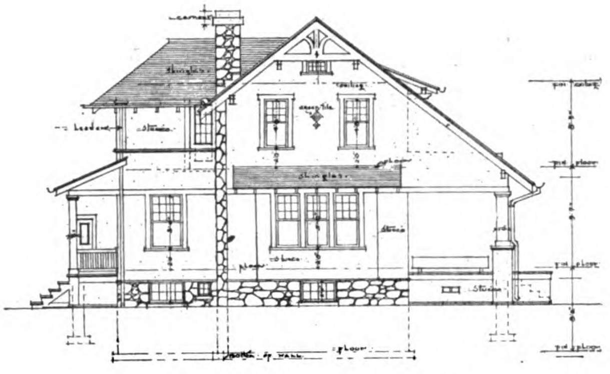


Plans and Elevations, Scale 1/16 in. = 1ft.

Access to the kitchen is had through a large and capacious pantry. Ample cupboards and a sink are provided in this butler's pantry, and in addition there is a refrigerating room beyond the kitchen which furnishes storage space in plenty.

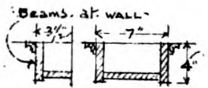
The arrangement of the service position of this house would arouse envy in many a housewife's soul. It will be observed that the maid's room opens out of the kitchen, making it unnecessary to provide a room for this purpose on the second floor. Thus the maid is always at hand; and it will be noted that there is a passageway from the kitchen to the living room, enabling her to reach the front door without passing through the dining room. This is an important feature in the small house where there is only one servant. It is also a very fine thing in the small house to provide a sink in the service pantry as well as in the kitchen. This avoids a great deal of confusion and extra labor in the serving of meals, and should be considered with more seriousness than is now given it. Having the refrigerating room next the rear porch makes it possible to put the ice into the refrigerator from the outside, saving more unnecessary labor in the cleaning of the iceman's muddy foot-tracks.

Laundry and vegetable rooms are provided in the basement, in addition to furnace room and a good sized coal bin. The stairs to the basement are directly beneath those leading to the second floor,

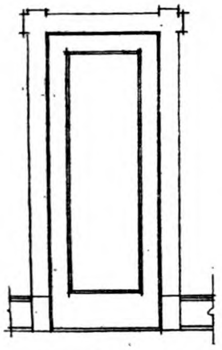


Side Elevation, Scale 1/16 in. = 1 ft.

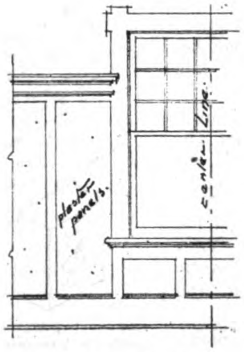
Plate shelf in dining room.



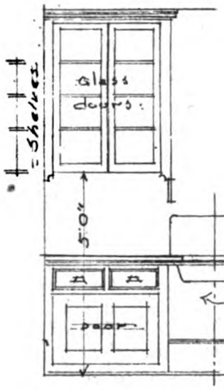
Ceiling beams.



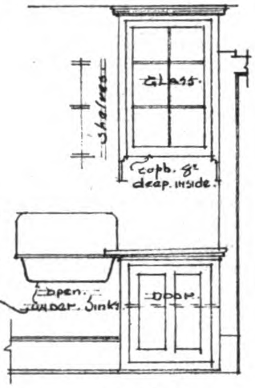
Interior doors and trim. For sizes see plans.



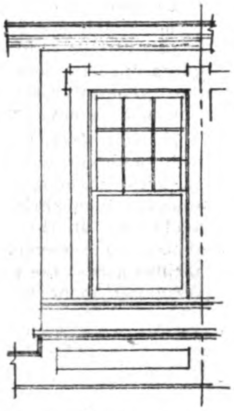
Windows and trim in dining room.



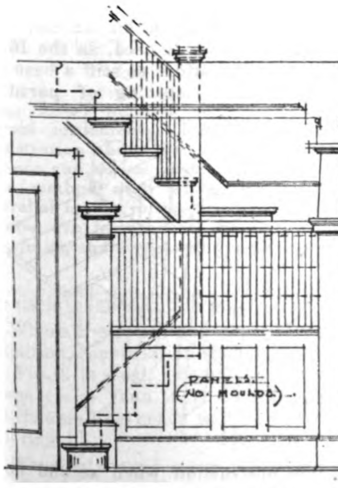
Cupboards in pantry.



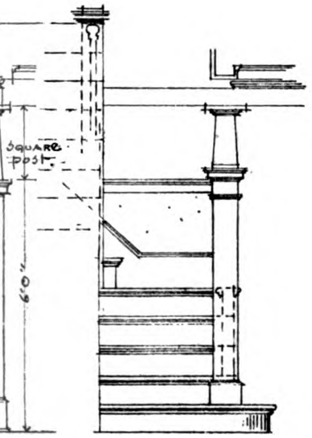
Cupboard in kitchen.



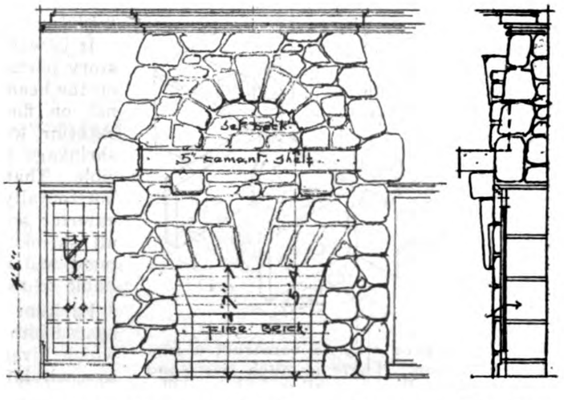
Windows and seat in living room.



End view of main stairs.



Elevation of stairs.



Book case, elevation of fireplace, and section of fireplace.

Interior Details, Scale ¼ in. = 1 ft. Scale of Plate Shelf and False Beams, ¾ in. = 1 ft.

and are reached from the passage between kitchen and living room.

On the second floor the same spaciousness is observed which obtains throughout the house; there are three bedrooms, a sleeping porch and one bath, besides large and ample closet room. The bedrooms are all large and well lighted. Each one has a large closet, and it will be noted that one of the rooms has two, both extremely capacious. There is also a large linen closet.

This house is electric lighted; and has hot water heat. It was built at Larchmont Gardens, N. Y., for Mrs. Bertha M. Van Ottinger, from the designs of W. S. Moore, Architect, 52 Vanderbilt Ave., New York City.

Partition Construction—I

Approved Methods of Constructing Partitions—Common Faults Are Pointed Out

By Ernest Drah

Improper construction of partitions is perhaps one of the most common faults to be met with in the average dwelling. Only too often is a partition treated merely as a dividing wall of no importance, whereas it should be recognized as an important factor in the stability of the frame and in the finished appearance of the house. Plaster cracks due to partition trouble are all too common. Much of this trouble is, of course, caused by the unseasoned timbers which the contractor most generally uses, but proper construction will remove much of this trouble.

The big factor in preventing settlement with consequent cracks is to allow as little shrinkage as possible and to equalize such shrinkage as may be unavoidable. In this connection two facts should be remembered: 1, that wood shrinks across the grain, ordinary spruce shrinking about ½ in. per foot; 2, that timber does not shrink perceptibly with the grain.

Partitions are often incorrectly constructed as shown in Fig. 1. The rough flooring is laid over the floor joists and the partition sole is then laid on the flooring. The studs are then toe-nailed to the sole. This construction is bad because it permits as much shrinkage and settling as is possible.

There are about 37 in. of horizontal wood so laid as to shrink and let the second floor partition settle; this is the combined width of girder, floor joists, flooring, partition soles and cap. This shrinkage will amount to as much as 1½ in. in the course of a year or so. Thus the attic joist would sink nearly 3 in. by the combined settlement of first and second story partitions.

A better way to construct the partition is shown in Fig. 2. Here the girder is framed at the joist level, and the partition studs are set on a sole placed over the rough flooring. The possibility of the partition settling, due to the extra 10 in. of joist at each floor is eliminated. Besides, the cellar ceiling is made more sightly by the elimination of the low girder.

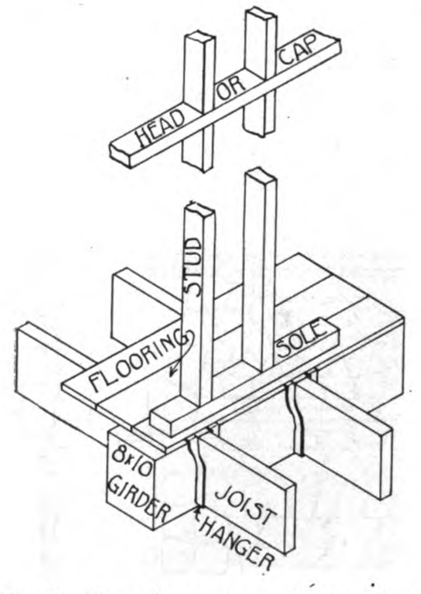


Fig. 2—A good way to construct a first floor partition. There is much less wood laid horizontally, so settling is less. The amount of wood laid horizontally in exterior and interior walls should be as nearly the same as possible, as settlement will then be uniform.

It is well to remember that all second story partition studs should rest directly on the head or cap of the partition below, not on floor joists. The shrinkage in exterior walls should be balanced with shrinkage in partitions as nearly as possible. That is, the amount of timber laid horizontally should be the same in both exterior walls and in partitions. Then all shrinkage will be equalized, settlement will be uniform and no cracks are liable to result.

Parition studs are generally 2 x 4, spaced either 12 in. or 16 in. on centers, which gives either five or four nailings to each lath. Where the partition exceeds 9 ft. 6 in. in height or where it is a bearing partition, the studs should be placed 12 in. on centers. Where partitions are over 11 ft. in height, 5-in or 6-in. studding is advisable. As regards stiffness, 5-in. studs placed 16 in. on centers will give a stiffer partition than 4-in. studs placed 12 in. on centers, even though less lumber is used, as the 16-in. spacing does not afford as stiff a base for plastering; 12-in. spacing of partition

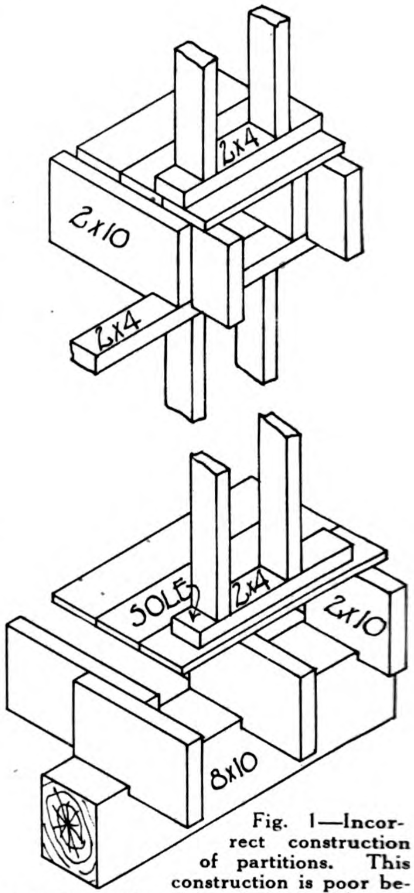


Fig. 1—Incorrect construction of partitions. This construction is poor because it permits of maximum settlement, with consequent cracking of plaster, etc.

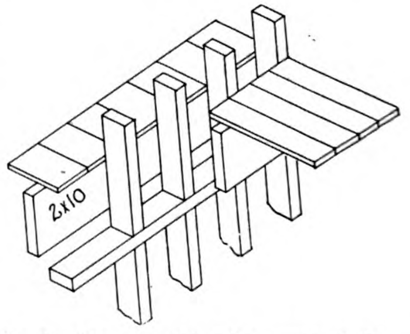


Fig. 3—Construction when second floor joists run parallel to partition. Studs should be set on a cap, and not on the floor joists as shown in Fig. 1. Joists should be kept 2 in. from studs.

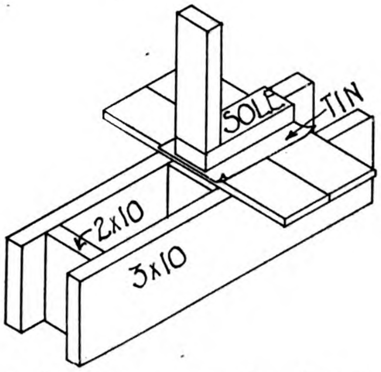


Fig. 4—Correct construction of partition running parallel with joists, no bearing partitions being placed below. Space is left for running heating pipes, etc., without cutting joists. The piece of tin acts as a fire stop.

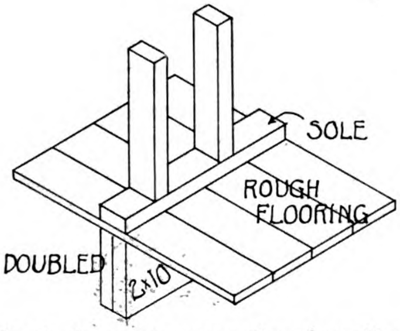


Fig. 5—Incorrect construction of partition running parallel with joists. No nailing base is provided for finished floor, and joists must be dangerously cut if pipes are carried up in the partition.

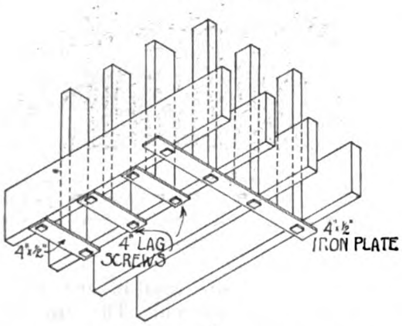


Fig. 6—A method of setting studs to avoid settlement. The right hand side illustration shows the method where partitions run across joists, the left hand side the method used when the partition is parallel to the joists; 4 in. x 1½ in. iron plates are fastened to the under side of joists, the studs without settlement.

studs is advisable for good work.

Where the joists run parallel with the partition, construction such as that shown in Fig. 3 is used. The joists should not come closer than 2 in. to the partition, so that nailing space will be left for the flooring.

Where a second story partition is not carried by a girder or by a first story partition, it must be supported by the floor joists.

When the partition runs parallel to the joist, it may be supported as shown in Fig. 4. Two joists are spaced about 6 in. apart and blocks are cut in between them, these blocks being spaced about 18 in. apart and placed with the grain of the wood horizontal. The two joists bearing the partition should be at least 3 in. thick, as any sagging will cause trouble. A sheet of tin is often placed under the partition sole to act as a fire stop.

Joists under a partition are often placed as shown in Fig. 5. This method is objectionable because no nailing base is afforded for the finished floor unless the joists are at least 3 in. wider than the partition sole, and because any pipes run up in the partition require dangerous cutting of the joists.

A partition supported by floor joists like this will of course settle slightly when the bearing joists shrink. This shrinkage is generally not sufficient to cause cracks in a frame building where the partition joins the exterior wall, but in a brick building cracks are likely at this point.

Two ways to avoid such settlement are: First, to use a steel I-beam, which is inadvisable where pipes are to be run through; second, to carry the partition studs on iron plates fastened to the under sides of the joists, as shown in Fig. 6.

Steel beams form a better support than the latter method just mentioned, but it is more expensive. When a steel beam is used it should be at least 1 in. shallower than the wood joists, so as to allow for any shrinkage that may occur in the wood, as shown in Fig. 7.

Where a partition runs at right angles to the floor joists it is usually supported as shown in Fig. 6. The sole is placed on the rough flooring. The joists in this case have a concentrated load, which has twice the destructive effect that a distributed load has. In addition, bridging will bring no relief as it will not serve to distribute or equalize the load in any way.

Especial care should be taken where openings occur in the partition. If the opening is wide, the joists should be wider or doubled so as to take care of the extra weight transmitted down through the doubled studs.

(To be continued)

Shingling Gutters and Valleys

By John Upton

I am often asked how to shingle a gutter or valley in a roof. Which is the better of the two common ways to do this important part of the work is another frequent question.

I do not know which is the better way, to lay the shingles—the same way as the others, up and down, or to let them follow the line of the gutter.

If we should make a diagonal cut through a shingled roof we would leave many small points under the other shingles. If in shingling a gutter with the shingles laid up the roof, every one of these points were put in its place this would be the better way. There are few of us who want to do this, and few owners who care to pay for the extra time it would take. Therefore I think that the most of us will make a better job of it letting the gutter shingles follow the line of the gutter. That is, to put them on slanting. This will make a smooth job and one that will not leak under ordinary conditions. The main point is to have the flashing wide enough and not to nail too low on it. Generally one should put in new metal—that is, galvanized iron—in reshingling, for the old flashing is not likely to be much good. It should be 12 or 14 inches wide and more on flat roofs.

I have used pieces of tin, some 8 inches square, laying one in each course like flashing, and putting the shingles close together in the valley. This makes a good job. One man here reshingled his roof this way after the first one had lasted 30 years. Another house fixed the same way has been all right for nearly as long. Where a long strip is used the gutter should be wider at the bottom than at the top, so that ice will not stay in it. If one leaks and the shingles are good a coat of paint may help it, for a time at least.

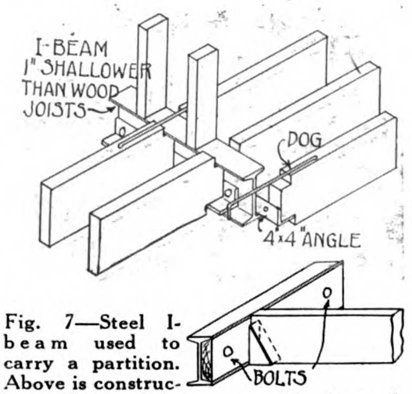


Fig. 7—Steel I-beam used to carry a partition. Above is construction where no hangers are used; at the right is a detail of construction where hanger is used.

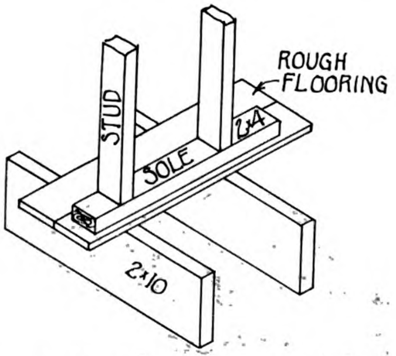


Fig. 8—Usual method of running partitions at right angles to joists. It should be remembered that in this case the joists bear a concentrated load, which is more destructive than a distributed load.

How a Sun Porch Was Added to an Old Mansion

This Article with Its Accompanying Illustrations Gives a Good Idea of How the Work Was Done. It Will Afford You Valuable Data on How to Do Similar Work

By W. A. Giesen, Architect

Measurements of the opening were taken at the building and a plan gotten out as shown in illustration. This was sent to the mill where the material, sash, panels, etc., were made and delivered in knock-down form ready for setting up; a list being furnished showing the sizes of openings, etc.

The erection of wood sash and glass, partitions, photographs of which are shown, not only provides valuable space for the owner of the property but enhances the beauty of the house itself.

The finished porch, as viewed from the front of the house. Note how it gives a sense of strength and solidity to the second story, this feeling being lacking before.

The interior of the porch is very attractive. This view was taken looking toward the rear of the house, where the "L" is situated.

Just now remodeling jobs are of greater importance than ever before. House owners are realizing that by spending a bit of money on their property the house can be made more valuable than it ever was or perhaps ever will be again. There is plenty of this kind of work to be had and builders who hunt the town for good prospects are in little danger of finding their hands idle.

The upper portion or second floor of the house when built was carried out over the first floor porch, by reason of which the appearance was not pleasing in looking at the house from certain positions.

With the sun porch partitions erected this was eliminated, as the upper part of the house sets down on them, as it were, improving the appearance remarkably. The rooms on second floor over this part of porch will also be much warmer in winter.

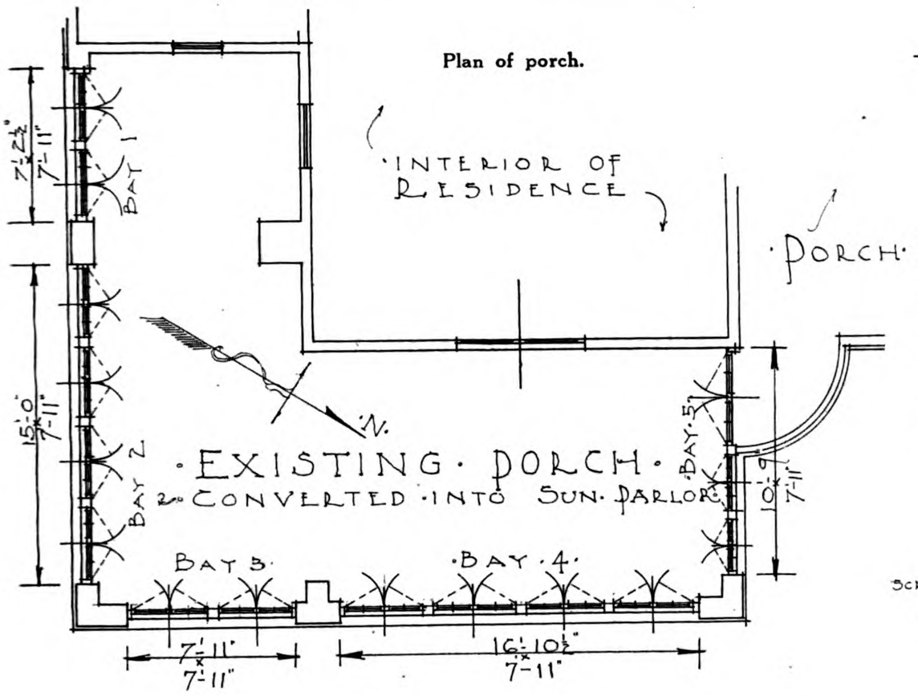
The sun porch partitions were started on the old porch floor after the rails between the shingled columns were removed.

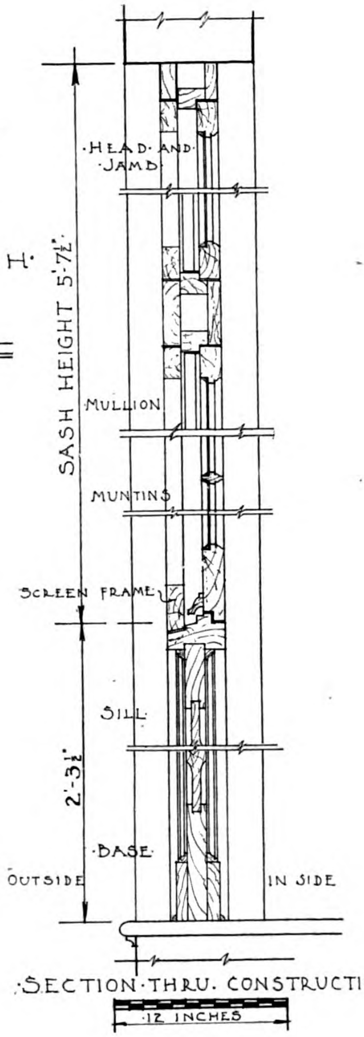
The outer casings and mullions were run from top to bottom in one piece. The horizontal sills were also in one piece from column to column. The sills at outer casings and mullions were hotched out. With this construction the utmost rigidity was obtained and at the same time it made a good weather-tight piece of work.

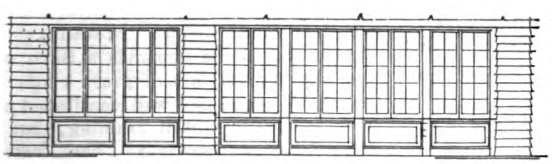
Outer casings were 1⅛ in. material, inner casings ⅞ in. Below the sills packing pieces were inserted to fill space

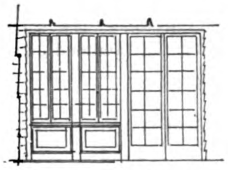
The finished porch as it appears from the rear of the house. Note how the porch windows scale in it with the rest of the house.

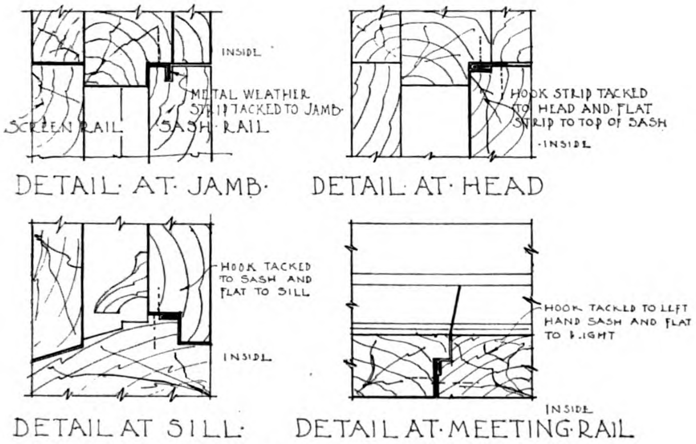
Four stages in the progress of the work.


Plan of porch.

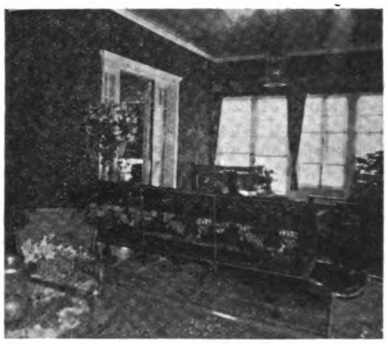



Elevations of Bays 3 and 4. Bays 1 and 2 are the same as these.


Elevation of Bay 5



Details of windows, showing weather stripping and general construction of frames.


Interior of the porch, looking toward the front of the house.

betweeen back of casings and face of panels, same being covered by mould trimming around panels and on top of base as shown on construction details.

The outer casings were gotten out 1⅛ in. thick to allow screens to set flush. Screen frames are of the same thickness, the screen wire being of copper. The sash were casements arranged in pairs to open inward with rabbitted melting stiles 1⅜ in. thick and glazed with double thick American glass.

All wood used in enclosure was of clear white pine.

The hardware is of solid bronze excepting screen hangers and adjusters, which are of galvanized iron.

Sash are provided with two 3½-in. butts to each sash, with one cremone bolt to each pair.

The screen adjusters allow of the screens to open and hold same in position or of locking when closed.

Sash were weather stripped with metal weather strips of zinc applied as indicated on details. The sash were plowed out and rabbetted for weather strips by carpenters at the work, who also installed them.

The woodwork was delivered primed

and after erection painted three coats of white paint and finished with a coat of dull enamel.

No large or small house is quite complete unless it has its sun parlor. The sun parlor gives one a livable space and is generally the most cheerful place in the house. This is due to the sense of openness given by the large area of window surface.

The addition of a sun porch usually adds to the attractiveness of a house. The little additional money spent in its creation is a good investment which, should it be desirous to dispose of the property, would have a selling value equal to the original cost, plus the interest, and not to mention the comfort value in the intervening space of time.

"Kinks" from a Carpenter's Diary

The Action of Wind on Barns Is Pointed Out from Actual Experience and Proper Methods of Bracing Emphasized

By Hammer and Saw

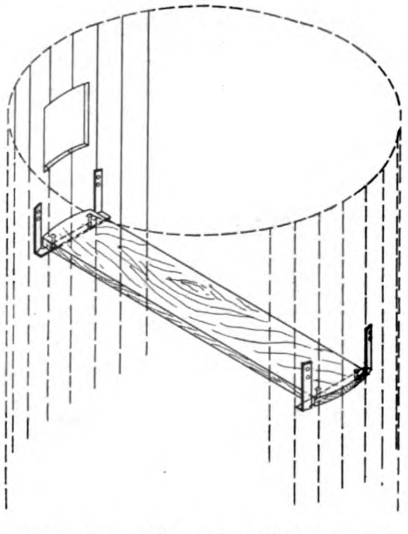
The action of wind forces on structures have ever since the inception of time caused great havoc. Estimates are made on the damages and complete devastation of property as a result of tornadoes and hurricane wind storms. The compiled figures in money value fall short of the actual amount each year, to say nothing of the injury, loss of life and invariable inconvenience to property owners.

For the benefit of the carpenter who has never taken very seriously the elements of wind forces when on a destroying rampage I state the particulars of one instance of the kind that happened the past winter. The structure was a gambrel roof barn, recognized among the craft as an ocagon type of roof. The dimensions of the superstructure were 40 x 70 ft. The sills were not anchored to the concrete wall. All the framing timbers were exceptionally heavy, with 12 x 12 in. corner posts and beams, 8 x 8 in. girts, 4 x 4 braces and 2 x 8 in. rafters. The side and end walls were covered with double thickness of boards placed vertically, also well battened. The heavy timbers were hewn maple, beach and ash, and the rafters were hemlock with two 1 x 10 in. cucumber boards for braces at each knuckle joint.

The wind blowing at a 70 mile velocity on the night of Feb. 25 shoved the barn a distance of 20 ft. along the wall until the east end struck the ground. I mark the time thus precisely, because I was one of the spectators at the scene the next day. The barn was located on a rise of ground facing east. About 80 rods in the rear was a timber belt, but too far away to act as a wind brake; in fact, the location was such that the building received the full force of the southwest gale.

A peculiar feature of the wreck was the condition of the rafters. The upper set were ripped clear through their width about a foot below the 1 x 10 braces, on both sides, and horizontally the full length of the building. The side walls spread out from the sills and rested at about a 45-deg. angle. The rafters dropped down from the apex several feet and were suspended in that position. The rafters on the plate were splintered and twisted, but most all of them still held to the plate. The nails were the common wire kind and were as bright as the time first driven twenty-five years ago, which was the age of the barn. The barn was half a mile from the owner's residence and was used principally for storage purposes. At the time it contained a hundred tons of baled hay and farming implements; some of these pieces of hay track, doors and other miscellaneous fixtures were blown several rods away.

The action of the wind in this instance apparently seemed to take a direct thrust, tearing and ripping lengthwise, instead of crushing down entirely. Whether the wind alone broke the upper rafters or acted in conjunction when the end dropped from the wall couldn't be determined; however, the fact was forceably demonstrated that these braces are important in a gambrel roof, for they held intact and acted as couplers at the knuckle joints of the weakest part of the roof, and the break occurred in the rafters below the joints.



A kink that adds to the efficiency of the silo. The blower pipe, carrying the ensilage, can be much more easily handled by the aid of this seat.

No human casualties are to be recorded in this instance, nor was the money value involved great, yet placed in the same position a structure far more pretentious under the circumstances would be wrecked. Deformation is perceptible in frame, and even steel skeleton structures, and what can we lay the cause to but the wind.

Probably the heavy timber barns with principal rafters were the strongest in construction ever built. They were erected at the time when materials was plentiful and cheap. Nowadays the farmer wants and demands a barn with sanitary stables, lots of grain room and one that's warm and well ventilated and, of course, substantial framing, but no more than is necessary. The farmers often have their own ideas regarding the way they want the barn erected, but the carpenter should not tolerate any infringement that in his opinion would affect the stability of the building in any way. The gambrel roof barn is admirably adapted to the farmer's use in every respect, and the old style barns are fast being remodeled with gambrel roofs. The framing for these roofs being the most important part of the work, care should be exercised in selecting their material. The rafters and braces should be sound and straight, and always the crowning edge of the rafters uppermost. If this is seen to we'll find the work of putting the roof together much facilitated.

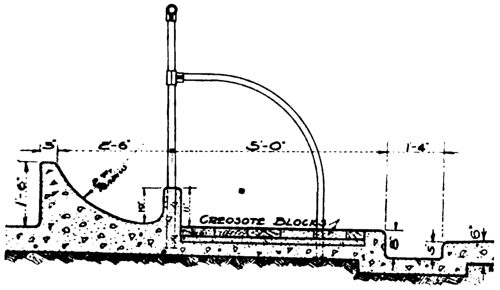
Cucumber, if available makes the best braces; two at each knuckle joint of the rafters, the nails driven tight and staggering. When the side walls are studded and placed the same distance apart as the rafters a piece of studding from walls to rafters can be added for a tie. This constitutes the necessary roof framing. Plank-frame barns built along these lines have stood up and under normal conditions proven their worth.

Silos of the kind that come knocked-down, already to erect, are lacking in some features which, if added, the farmer would appreciate. When the silo fillers come along in the fall they have a blower pipe from their machine leading to a hole in the silo, and the ensilage passes through this pipe to the inside. The pipe has to be fastened at the top, and a man carrying the end up the outside ladder

is in an awkward position, and on a windy day has too much trouble in fastening the pipe. One silo owner spoke to me about this and with the blacksmith's help we made some hangers out of ¼ in. x 3 in. band iron and of convenient length. Two of the hangers were bolted to the sides inside and a plank bolted to them, which made a staging for a person to sit on, and with rope and pulley the pipe was easily hauled up and the end fastened secure. When the blower hole is large enough the staging can be gained that way or from the inside of the silo with a ladder. The staging proved so handy that several parties got them. Figure 1, showing the hanger, is self-explanatory.

Some Miscellaneous Farm Buildings

By W. E. Frudden



A sanitary cow stall and manger.

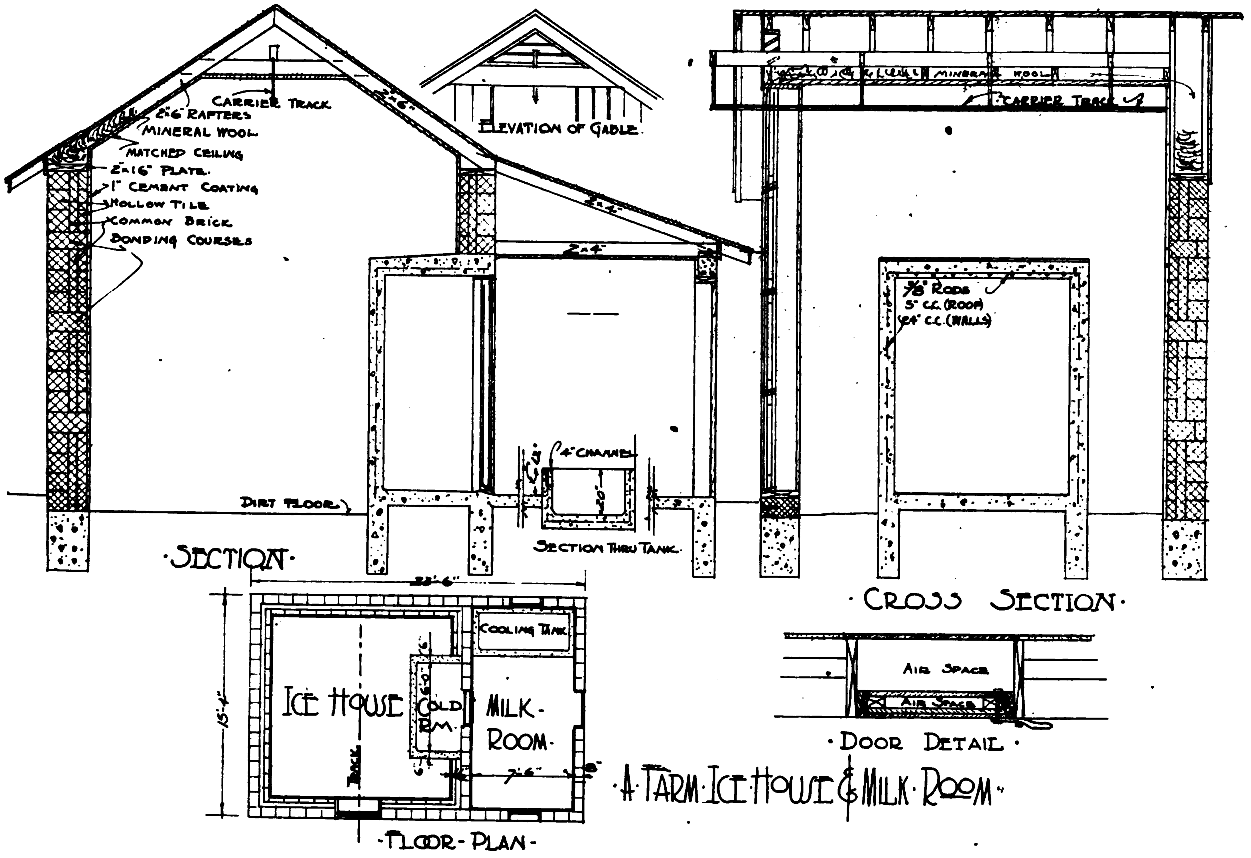
For cow stall floors creosoted yellow pine blocks have great value. They are warm, smooth, sanitary, moisture proof, and if laid right will last for years. The preservative that is used in the treatment of the wood blocks is a disinfectant and will help to keep out vermin.

The foundation for the block should be three inches of concrete mixed with one part cement, three parts sand and four parts gravel. A one-inch thick bed of cement and sand is placed under the blocks. Use well screened sand and mix it with sand one to three. Sprinkle the mixture just before laying the blocks. Make the floor smooth. The joints must be close together.

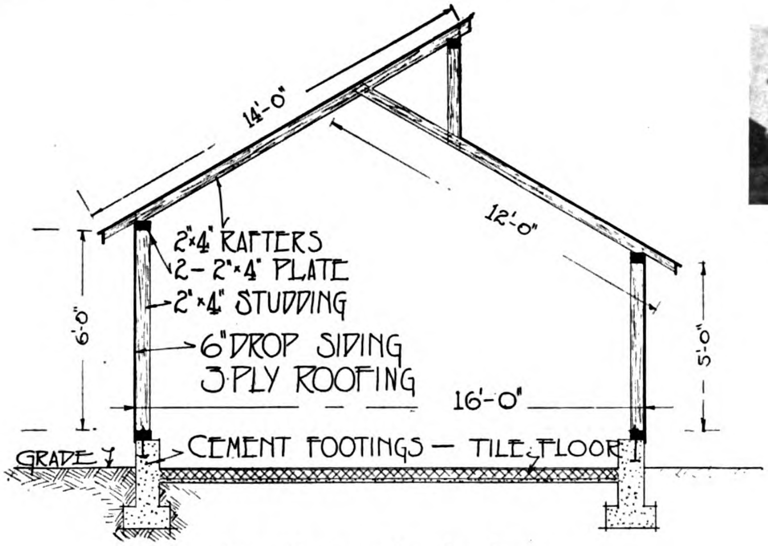
When completed fill the cracks and joints with cement or sand. Horse stall floors as well as cow stall floors can be well made of wood blocks. They are inexpensive and are most ideal.

Slope the cow stall one inch to the gutter. The dimensions that are given in the drawing will be found to be most generally accepted as correct by all practical dairymen.

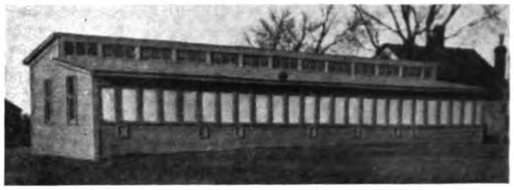
Since I have been out studying about farmers' buildings, I have noticed that this type of a poultry coop is gaining



Details of an ice house and cold room that has been proved efficient.



A popular type of poultry house.



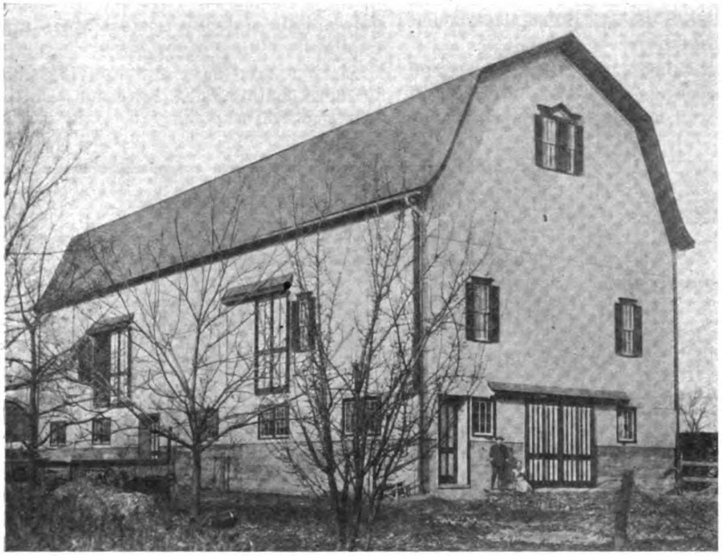
Finished appearance of the poultry house shown in section at the left.

great favor in every section of the country. Farmers everywhere like this practical design for a chicken coop. It is light and airy and very convenient.

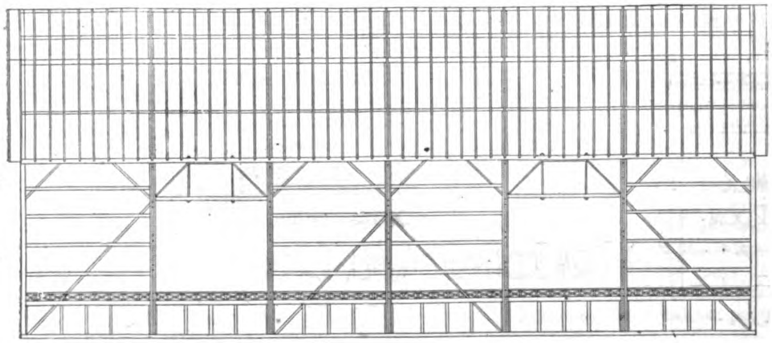
This house here illustrated is 16 feet deep and 50 feet long and built of frame. It faces the southeast and has glass in the upper monitor windows and cloth in the lower side wall windows.

Oftentimes this sort of a coop is called the half monitor poultry house.

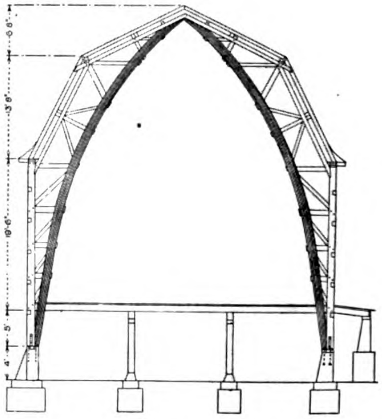
Dairy Barn Built by a Building Age Subscriber



Dairy barn built by Wells Brothers, Scottsville, N. Y. This barn is an excellent piece of work, attractive and well planned.



Side framing of the barn built by Wells Brothers.

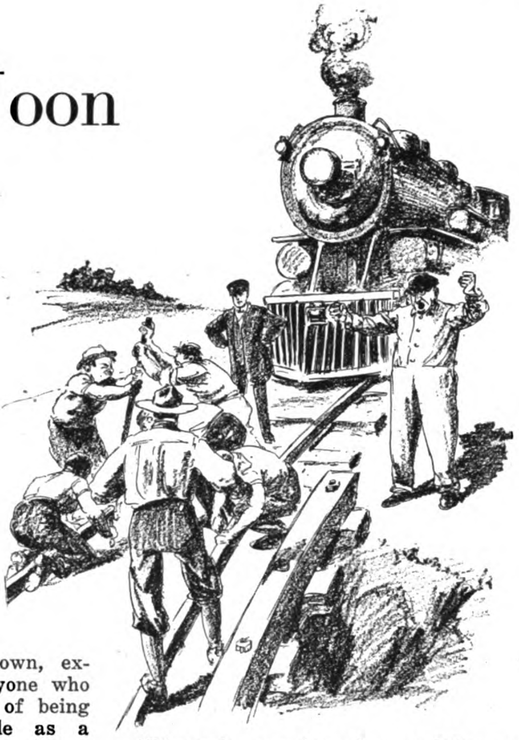


End framing of barn.

Some Echoes of the Noon Hour—XIV

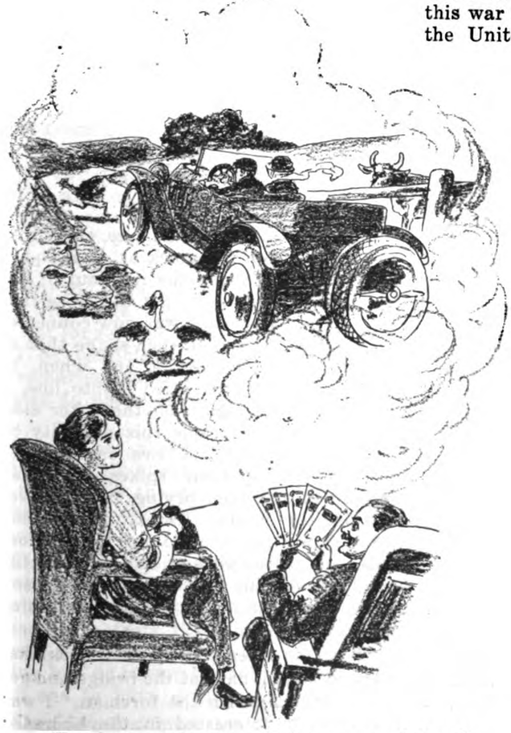
Bliss Points Out Why Every Member of the Gang Should Own a Liberty Bond—Trouble with Railroad Rails Gives the Gang a Good Laugh

By Edward H. Crussell



"The train soon showed up, and the engineer entertained the gang with his opinion of their working qualities and various abilities."

The gang, departing from their usual custom because of what was in the air, had been discussing the relative merits of Liberty Bonds and War Savings Stamps. One of the new comers who, because of his boasting and egotism, had been given the sobriquet of "Truthful James," had been foolish enough to make unflattering remarks concerning both these investments. He had quickly, and quite thoroughly, been taken to task by Bliss, who, in language which cannot here be set down, explained to him how much anyone who held those sentiments, lacked of being as high in the social scale as a "mangey yellow dog." The latter part of Bliss' tirade was milder in tone, and may be given verbatim.



"Pretty soon Scotty will have enough bonds to buy a Flivver with—the only money he has ever saved."

"A few years ago," said he, "before the days of the Postal Savings Bank, if you had been given the chance to buy fifty dollar, or one hundred dollar, U. S. government bonds, you would have jumped at it. If any government in the world will be able to pay its debts after this war is over, that government will be the United States of America, and its bonds are as good to-day as they have been at any time in its history. Ducks like you haven't learned yet that we are at war, and I'm going to try to explain to your lack of intelligence that just because you happen to be old enough to escape the draft doesn't relieve you of all your responsibilities. You are exempted, not because you have attained a certain age, but because, having attained that age, you are not worth the time and expense it would take to make a soldier out of you. If you think that's anything to brag about, go ahead and brag.

"You don't have to bother your head about whether someone else is taking all the bonds they ought to, or not; if you know positively that they are not, turn their names in to the Liberty League and then forget about them. Your chief business is to subscribe for all you can, then subscribe for a little more, and then, instead of feeling puffed up about it, hang your head in shame to think that while your neighbor gives his lift, all you are able to do is lend a few paltry dollars; dollars that would be of no use to you anyway if it were not for your neighbor, and others like him, risking their lives to make your dollars, and your liberty, safe. I've been listening to your whining and complaining long enough, and I serve notice on you right now, that as long as you're in this outfit you'll quit bellyaching about Liberty Loans, war bread, lack of sugar and any other little inconvenience you may be put to, or I'll make you a candidate for the accident ward in the county hospital. If you think I won't, say so; I'd just as leave show you now as any other time."

"And that seems to be all, and perhaps a little more than all, the occasion demands," broke in Old George. "You ought to get yourself a job with those four minute speakers. The original argument was as to which of these investments was the best for fellows like us. I have some of each, and speaking from my experience I'm inclined to favor the bonds. Not because they are a better investment but because, having bought say, a hundred dollar bond, you feel compelled to keep up the instalments until it is paid for. The War Stamps haven't the same pressure behind them and though I feel ashamed to say so, I'm pretty sure that I wouldn't have been able to save as much, buying the stamps, as I have buying the bonds. This, of course, is because of my peculiar nature, which will not permit me to save anything without being driven to it."

"I guess there are plenty of others in your fix, George," said Scotty. "The

wife and I were figuring the other night that we'll have enough bonds to buy a flivver with, after the war is over, and it's almost the only money we've ever been able to save.

"I was arguing with one of my neighbors the other night, he's one of these peace-at-any-price old mutts, who is always wishing 'this terrible war would end.' In the excitement of the moment I told him that if it ended before Kaiser Bill and his friends got all that was coming to them, I'd start a new war of my own. And then a small voice inside me said, 'Big talk boy! big talk, what are you doing to help win the present war?" And when I had counted up everything, it wasn't much. A few dollars to the Red Cross and the Y. M. C. A., a day or two's time donated to the exemption boards, and a few spare dollars invested in Liberty Bonds. I tried to tell myself that there were others who had not done as much, but that didn't help any, some day those boys are coming home again, and as they march down main street with Old Glory at their head, with the whistles blowing, bells ringing, women weeping, and everyone cheering themselves hoarse, I want to be able to stand squarely on my own feet, look anyone of them in the eye and say 'I did all I could.'"

"Hurrah!" yelled the Kid; "When that day comes, Liberty Bonds will be above par, you'll be able to buy your flivver and we'll all go down town with you. In the meantime, I'd like to have Shorty tell us the remainder of the history of his trip to the country. He said he had more to tell us, and ever since then I've been anxiously waiting to hear what it was."

"I've always noticed," began Shorty, "that those things so anxiously waited for, never seem to come up to our expectations, no doubt it will be so with the incident I was so foolish as to mention. Although my folk's place is some miles from a railroad station, the railroad runs quite close by it, and as there was a construction gang working on a steel bridge that spans the creek near there, I spent some of my time watching this gang at work. Somehow, nothing seems to rest me more than watching other folks at work.

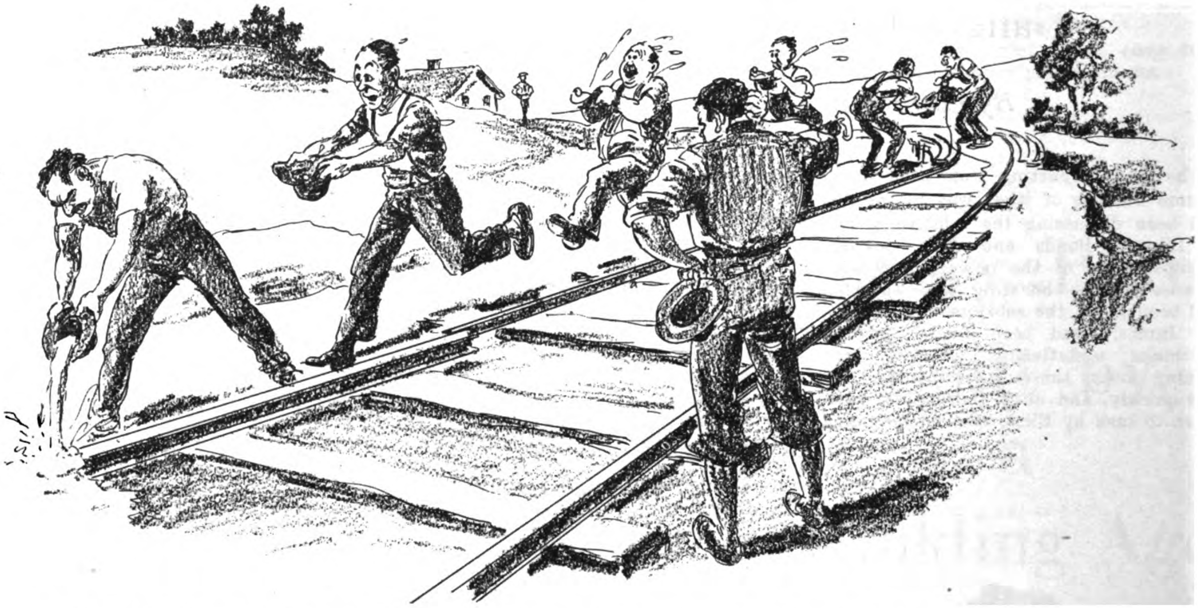
"The first day I went over, the foreman was in all kinds of trouble, they had been putting new ties on the bridge and in order to do so had removed the rails. Of course, they had protected themselves against trains with red flags and torpedoes, but the day was frightfully hot, and when, just before train time, they came to put the rails in place again, they found the heat had expanded the rails until they were some four inches too long."

"That's some expansion," said the Kid, "How long were the rails they had taken out?"

"All the expansion didn't have to be in the rails that were taken out," explained Bliss, who was an old railroader, "There is a difference of nearly a quarter of an inch in the length of a thirty foot rail between the extreme temperatures of winter and summer. When rails are laid in cold weather, allowance is made for this; small pieces of metal of the correct thickness being placed between the ends of the rails as they are laid and afterward taken out. The spaces left by them allow the rails to expand; but sometimes, from one cause or another, not enough space is provided and we get what is called 'heat kinked track.' On a hot day, if you make an opening in the rails anywhere and leave it open for any length of time, the rails will crowd from each end so that the expansion from several hundred feet of track may be projecting into the opening—but go ahead Shorty, how did your friend get out of his difficulty?"

"Well to tell the truth," grinned Shorty, "when I arrived on the ground, I thought they'd all gone crazy. They had one drinking bucket with them, and with this tied to the end of a rope, one man was baling up water from the creek and pouring it into the other fellows' hats; each man, as his hat was filled, ran madly along the track with it pouring the water on the rails to cool them off. After keeping this up for some time, they took one of the loose rails and using it as a battering ram, pounded on the ends of the projecting rails in an endeavor to drive them back. All this work made conditions better, but the rails were still too long, so as a last resource, they drew the spikes from the track at each end of the bridge and threw the rails out of line until they were able to get the loose rails into place. The track was now connected up again but it was in such shape that no train could pass over it, and when, by means of bars, they pried it into line, it would kick out again on the other side. The foreman overcame this difficulty by bolting a number of ties fast to the bridge, driving some spikes part way into them and then prying the rail over against the spikes. The train they had been expecting, showed up long before this was accomplished and during the whole sweltering time, that entire gang was as busy as a fire brigade at a three alarm fire.

"I got so interested in this work that I spent several days at the bridge and got quite chummy with the foreman. I was particularly interested in the hydraulic jacks they were using. Of course, I had heard about these hydraulic jacks (or



"The rails were expanded by the heat and the foreman could not get them back in place. So the gang ran to the nearby creek, filled their hats with water, and rushed madly back in a wild endeavor to chill the rails into decency."

whisky jacks, as the gang preferred to call them) but I never had seen one of them work and often wondered how one man could possibly make them lift seventy-five or a hundred tons by merely working a lever. Something went wrong with one of these jacks and as the foreman took it all apart, I had a good chance to get a squint at its 'innards.' The explanation is very simple, as I suppose most of you know; the jack is nothing more than a modified force pump. One hundred pounds on the end of a four foot lever, applied to a small plunger, forces liquid in small quantities under the lifting ram. The principle is much the same as a block and tackle, or a chain hoist; the power, moving rapidly through a long distance, is able to move a much greater weight, very slowly through a short distance."

"Just why, do they call them whisky jacks?" queried the Kid.

"They use alcohol, or a mixture of alcohol and water in them in the winter time," was the reply, "because water alone, would freeze and burst the jack. The foreman told me a number of anecdotes concerning this matter and the trouble some of the old timers would go to to get a swig at the alcohol. To prevent them drinking it, it was usually mixed with a small quantity of crude oil. According to the foreman's story, men have been known to get drunk on it, even when doctored with the crude oil.

"He told me of another thing in connection with one of these jacks that I thought you'd be interested in. There are many different makes of them and they release in different ways. The usual way is by means of a key, which, when it is turned, permits the liquid to run back from under the ram into the reservoir again. Other styles are lowered by removing the jack lever, replacing it upside down and bearing down upon it. The lever is so shaped that by reversing it, it can be pushed further downward and this extra movement of the plunger releases a valve inside the jack and permits the return of the liquid.

"The foreman said he was once using this style of jack which was working alright except that when there was any weight on the jack, the lever would not stay down. This didn't seem to be of any consequence and they put the jack under the bridge and raised it to where they wanted it; when they came to let off, however, they couldn't do so, because the lever was pressing against the floor timbers of the bridge and could not be removed; they could work the jack upward alright, but could not let down. A train was due, as trains nearly always seem to be in railroad work, and what our foreman did was this. He had used a large cross timber for lifting the bridge, under the center of which the jack had been placed, there was no room to get at the timber with a saw, but by means of a crank auger, they bored the center of the stick so full of holes that it gave way and let the bridge back into place.

"Another thing he told me was, that when raising a heavy bridge, it was often necessary to use a number of jacks and great care had to be taken when releasing them to see that they were all released at once, because if one of them stuck the extra weight would, in all probability, burst it and perhaps injure someone. He explained, in a nonchalant manner, that wherever possible he always used wood between the head of the jack and the load, as that gave the jack a chance to force its way up through the wood instead of bursting.

(*To be continued*)

Heating Workmen's Homes

By E. W. K.

There is no question but that a great deal of thought is now being given to housing workingmen, but much of this thought is not a credit to the think tank in which the thinking is done. In the first place, a matter important all the year around is that the closet space is entirely too small when it is provided, and in many instances no provision is made.

A closet should always be deep enough from front to back to permit the head of the house to hang his coat on a stretcher on a bar that runs lengthwise of the closet, and on which other hangers can be used, and these moved along on the bar so that what is wanted can be easily taken out.

Give the woman more closet space and she will make the clothing of the family last longer, and an important economy will be possible which the present-day mercenaries who erect workingmen's homes do not seem to have any interest in.

It was not closet space which I intended to talk about, but inasmuch as it is needed all the year around a word about it for the workingman's home is important.

The workingman's home should not be constructed with a view to meeting the limited requirements of the animal who comes here from the other side of the ocean, and who has little desire for anything but to be comfortably warm, well fed, and to have a place to sleep.

Consideration must be shown to the workingman who is now on the other side of the Rocky Mountains, but who may be, through necessity, brought eastward to live. He must have a home within his means, but generally the one that somebody has erected in anticipation of his coming also anticipated getting a large interest on the investment rather than providing comfort for the prospective tenant. The encumbering of ground with such structures must not be permitted.

The people who build houses must not nail a few boards against some uprights so loosely that the wind can blow so'er it listeth, and so that he can fly a kite in his parlor. More attention must be paid to making that home airtight to keep out both the heat in the summertime and the cold in the winter. If the space between the plaster on the inside and the clapboarding on the outside of the studding is practically airtight, and air cannot move through it, one of the best insulations in the world against both heat and cold is the result. Let his house be so built that it can be heated.

Now, the next thing is the character of heating outfit that is put in such a house. Many such homes have a warm-air furnace placed in the basement, and there is no reason why it will not make the most economical and cleanest means of making the several rooms of the house comfortable, so they can be occupied under all conditions. But it cannot be done if the pernicious partition riser is used in connection with the furnace. In the workingman's home, in particular, esthetics, as a rule, are neglected shamefully. There is no reason why there should not be a sufficient jog in his wall to allow a round riser to run up to serve the registers on the first and second floors, reductions being made as is the common-sense practice of skillful furnacemen, and registers being so placed that with a vertical diaphragm in the pipe air is bound to flow into every room. If there is a return pipe from the stairway or front room, so the air from upstairs can come down and go back to the furnace, and then be heated and come up again, and be kept in circulation, the little home can be admirably heated with a small amount of fuel. The doors will open with sufficient frequency, and the material of the home, however built, will leak sufficient air to take care of all ventilation necessary under ordinary conditions. If those who are fresh-air fiends want more air, they can open the doors and windows and get all there is outdoors, if they desire.

The main thing is to make the workingman's home comfortable and economical, whether it is warmed by a furnace or a boiler. In too many instances the boilers used are too small, the piping too small, and the radiators too small, all in the interest of the first cost to the man who sells it and gets away with no further responsibility, but at the greatest possible cost, distributed over many years, to the man who is so unfortunately situated in this world's goods that he has to live there or outdoors.

There should be in the building codes of all cities provision that no warm-air riser shall have a greater width than twice its depth. This would do away entirely with the pernicious partition flue.

Remodeling Jobs That Are Yours for the Asking

Some Practical Ways in Which Progressive Builders Have Recently Secured New Business

By Robert F. Salade

It is always possible for the builder with original ideas to promote new business for himself and for others. No matter how unusual the times; no matter how great the difficulties may seem, the builder can always find enough to do to keep at least a small force of workmen busy. There are no good reasons for any builder or contractor to remain inactive when regular business is scarce. There is plenty of new business on every side for anyone who will make the effort to develop it.

Times may be unusual and difficulties may seem almost insurmountable, yet there is always the opportunity for the wide-awake man to secure such business as may be had. An eye for business combined with intelligent seeking will do much to keep one's time profitably occupied.

The practical builder—the one who is capable of turning his hand to almost any kind of building work—is in a more advantageous position than other business men who are engaged in other fields of labor. During slow and uncertain periods of time, while many other business men are forced to wait for better conditions, the builder can start out on a walk through his town or city, and if he possesses a keen eye and a thoughtful mind, he will return from his stroll with some new business in hand. In other words, the builder with ideas, whenever he pleases, can go out in the world and create business.

It is the writer's purpose in presenting this article to explain how certain builders and contractors of Philadelphia have made new business for themselves during "quiet" seasons. It is hoped that the ideas which will be set down in the following paragraphs will serve as good suggestions for other builders and contractors. If the ideas are not new to some readers, the methods through which the ideas were developed should at least be instructive and interesting. The principal thought of the writer is to explain how the new business was "created."

In one section of Philadelphia is an exceedingly large street car barn. Near this barn is a considerable number of small homes, built in solid rows. There is also a few stores at the corners of streets. Directly across from the front of the car barn there had been a row of small houses with storefronts. For some reason these stores had proved failures for small merchants in various lines, and for a long time the stores had remained vacant. In fact, the entire row of houses had been empty for more than two years, as few people cared to rent the houses (which were small) with the vacant stores serving no useful purpose. It was a great loss for the owner of the houses, of course.

One day an enterprising building contractor called on the owner of the idle homes. The builder stated that he desired to offer a suggestion which, if adopted, he felt sure would be the means of renting all of the houses within a short time. Naturally, the owner was all attention.

"My idea is to have those store-fronts changed over to Dutch halls and parlors," the builder explained. "I have drawn plans whereby the transformation can be made at comparatively small expense. There would be only a little brickwork. In place of the plate glass fronts, there would be triple windows of the Colonial type. The entire improvement would cost only $....., and with the great demand for small homes at the present time, I feel that you could easily rent the houses at $00.00 monthly. That's more than you could get, even if you were successful in renting the buildings as they now stand. The additional gain in rent would soon pay for the improvement."

"I believe that you are right," admitted the owner thoughtfully. "Your figures for the improvement are far less than I would have thought possible. All right, go ahead with the work. I like your idea of the Dutch hall and parlor, and the triple window plan. According to your sketch, the houses when the improvement has been completed will look like new."

Within several weeks the builder had finished the work, and even while the changes were being made a number of people rented houses. More than a thousand motormen and conductors were connected with the carbarn across from the homes in question, and many of these, who had no interest in the store-buildings, were deeply interested when the stores were replaced by attractive houses. After the change had been made, the owner could have rented perhaps several hundred more of such dwelling places had they been in the neighborhood.

Now, while it is often the case where it would pay an owner to have homes converted into stores and business places, according to the location, it is likewise true that in some instances (like the case mentioned) it would pay to have small stores changed over to private houses. In practically every city one can find certain sections where there are too many small stores. It may be that a considerable number of these stores have been vacant for long periods. There is not sufficient local business to keep all of such stores occupied in business. So, why not have the store-fronts transformed after the plans which have been mentioned? Here are opportunities for builders to "create" new business for themselves as well as business for the owners of vacant stores.

In some sections of Philadelphia there are rows of two and three-story houses, built with plain brick fronts, and with three or four stone steps leading to the doorway. When in good physical condition, a home of this model is always popular, although within the last few years the homes with front porches are the most popular. In one of the districts of the city referred to several rows of plain-front houses had been rundown physically, and they had been empty for more than a year. Through the good work of a builder who makes a specialty of repairing, the old houses were renovated, and to-day they are occupied by a desirable class of tenants.

The builder who put these houses in good shape has worked up an idea in the way of a porch for a plain-front residence which promises to prove very popular in the near future. The porch is of the "set-in" type—that is, it occupies part of the space which had previously been taken by the parlor of the house. It should be mentioned that the parlor had been spacious, so the parlor was not made too small by taking away the necessary space for the porch. The floor space of the porch is about 16 ft. wide by 7 ft. deep. In making the improvement, the brick front of the first floor of the house was removed, and a girder was inserted

Unprofitable stores or houses can often be remodeled in such a way as to advantageously utilize the neighborhood's changed conditions. Ways in which this work have been profitably done are pointed out in this article.

to support the rest of the brick front. The bricks, window sashes and door, which had been removed, were used again for building a front to the house at the back of the porch. The same stone steps were used as steps to the porch. The floor of the porch is flush with the original floor of the parlor, which is elevated about four feet above the street level.

This is an idea which no doubt could be followed with advantage in many cities where there are rows of plain-front brick houses which are in need of renovating. The "set-in" porch greatly enhances the appearance of the house, and the porch is far more useful to those who occupy the house than stone steps. Old, "straight-front" homes can be changed over to better models merely by the addition of porches of the kind described. With old houses completely renovated inside and outside, and with porches built in them, the owners could secure higher rents; a better class of tenants would be gained, and the owners would be helping to beautify their city.

Speaking of porches, another builder is making a specialty of building portable porches for plain-front houses. The porch is so constructed as to set on the sidewalk in front of the house. Some of these porches are made entirely of wood, others have steel frames with the floor of wood. The floor of the porch lines up with the top of the steps in front of the house. The construction of the porch of this design is such that it can be "knocked down" in small sections, and can be stored away in the basement of the home during the winter. The floor space of the portable porch is about 10 ft. by 4 ft., giving just enough room for three or four rockers. The idea in having such a limited amount of floor space is not to take up too much space of the sidewalk. A porch of this model is far more useful to the people than small stone steps in front of the house. With a neat awning hung above the porch, the whole effect is pleasing to the eye.

There is another type of porch which during recent years is appearing in considerable numbers in front of plain-front homes of Philadelphia. This porch is built of brownstone throughout, and it presents a handsome appearance. The railing is low, cut from brownstone in an artistic pattern. The supports are also of the brownstone, and they are of graceful form. The plans have been arranged to include to regular stone steps in front of the house as a part of the porch. As a rule, the steps are of brownstone of the same kind as used for the porch. A stranger in the city would readily believe that a brownstone porch of this character had originally been built along with the house.

An odd shaped lot is often just waiting for a suggestion as to how it can be utilized. The builder who points out how it can be turned into a profit builder will go away with an order in his pocket.

Several builders of Philadelphia are making a specialty of erecting rows of small private garages on long, narrow lots which could not be well used for other purposes. One recent operation consisted of fifteen of the garages. They are set on a piece of ground in size about 100 ft. long by 12 ft. deep. The back wall of the row of garages is of brick. The walls which separate the garages are of corrugated iron. The doors are of wood, and there is a window in each door. The floors are of concrete. There are electric lights for each garage.

The garages are rented by the month to people in the neighborhood who own automobiles. The row of buildings is numbered from No. 1 upwards. Mr. Brown, for instance, rents No. 3 garage, and so on. This idea has been so successful that the builders have found it advantageous to erect rows of the private garages on various small and odd-shaped lots of the city. Some of the garages are built entirely of brick, with the exception of the roofs and doors. Others have been constructed of brick and corrugated iron. There are no heating plants.

One builder has developed an extensive business is special repair work and improvement work of all kinds. His principal work is renovating homes of the better variety. Parquetry floors and hardwood window seats are put in houses which originally had lacked these desirable features. Some houses are completely remodeled. Wood-and-glass partitions are built for fronts and sides of porches. Outside kitchens for homes are built of corrugated iron, of wood or of brick. There are many other kinds of improvement work, and in most cases the builder "creates" the orders by calling on the owners of the property and by offering suggestions for the improvements in question.

Not long ago this builder heard of a certain row of houses which, while of good construction, lacked one thing—a commodious parlor. The parlors were of the reception hall type: a Dutch hall with a partition separating the parlor. This plan made the parlor entirely too small for a family, and the owners of the homes often remarked about the reception-hall-parlor being an objection. So one morning the builder called upon one of the owners and he explained how at slight expense the wall separating the parlor and hall could be removed. With the wall or partition eliminated, all of the space taken by the hall would be included in the parlor, making an apartment spacious and comfortable.

Strange as it may seem to the reader, the owner of the house had never thought of the idea of eliminating the wall, and when the builder offered the suggestion the owner immediately recognized the advantages to be gained. The builder quoted a price for carrying out the improvement and he received the order. After the work had been completed with the parlor newly papered, the owner and his family were delighted over the change. Neighbors who occupied homes of the same style were invited in to see the transformation. The final result was a lot of additional business for the builder.

In the section where this builder lives are many two and three-story homes with front porches. With few exceptions the floors and steps of the porches are of wood. The weather soon causes rot and decay, thereby necessitating frequent repairs. Whenever the builder notes in passing a house which needs porch repairing, he finds out the name of the owner and he writes the owner a letter, calling attention to the work required, and quoting a price for the work which is to stand for one week only. In numerous instances the builder receives quick response to the letters. He has gained a great deal of new business through this method.

Storm windows and storm doors are a profitable small line. Many small sales can readily be made, which result in a good profit. Porches that need repair, rotting steps, etc., are all fruitful sources of business for the observing man.

When receiving an order to repair a porch, the builder always mentions to the owner the fact that concrete steps and flooring for a porch will last for a lifetime, where wood steps and flooring will last only for a few months without repairing. In not a few cases the owners are influenced by this advice. The builder has reconstructed many porches, constructing solid floors and steps of concrete. In several instances even the porch railings have been made of concrete. One of the recent orders was for porch floor and steps in concrete of a dark-red color, with the railing of concrete in the natural color. The effect is very pleasing.

Another one of this builder's specialties is making screens to order for homes of particular people. Some of the screens are of the full-length style with hinges. Others are of the sliding design, with either copper or steel netting. Hardwood is usually cut for the frames, finished in the natural color to match the woodwork in the houses. The builder has also made a large number of screens for porches. Whenever possible, the builder takes orders for the various kinds of screens late in the fall, and the work of making the frames and covering them is done during the winter months, in the builder's shop, when outside work could not be done to advantage.

Still another specialty of the builder referred to is making storm windows and doors for houses in the suburban sections. The windows are hinged to the sashes, on the outside of the regular windows, and they are very efficient in keeping a house warm during extremely cold weather. The stormdoors are for the same purpose.

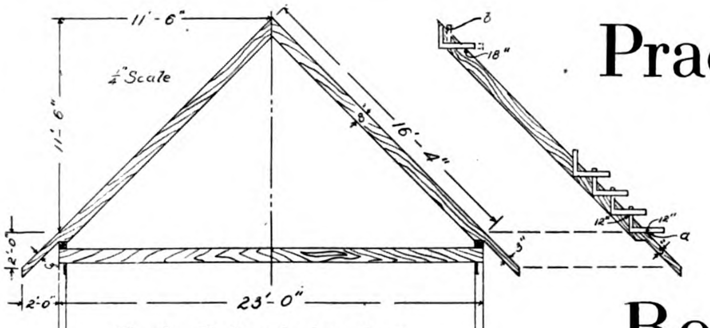


Fig. 9—Finding the Length of a Rafter on ½ Pitch Roof

Practical Methods and Details of Roof Framing—II

By Lawrence S. Kerr

Next to be considered is a plain gable roof on a building 23 ft. wide. The roof is 12 and 12 cut or ½ pitch. Half the width of the building is 11 ft. 6 in. and as the rise and run are alike on ½ pitch roof, the rise is also 11 ft. 6 in. Measuring across the square from 11½ in. to 11½ in. will give 16¼ ft. as the length of the rafter as shown on the right side of the roof Fig. 9. The rafter projected out to the right of the drawing shows how the length and cuts are obtained by use of the steel square. The run of rafter being 11 ft. 6 in. the square is applied once for each foot of run or 11½ times starting with the 12 in. mark on the blade at the point a. After applying the square 11 times, the 12 in. mark on the tongue will be at b and 11 ft. of the rafter will be laid out. The next 6 in. as shown in Fig. 10 is found by marking the line c,d along the lower edge of the square and then sliding the square along the line from d toward c, a distance of 6 in. The line e,f will be the plumb cut at the top of the rafter.

Referring again to Fig. 9, the tails of the rafters project 2 ft. square out from the building and the tails are 3 in. deep measuring square across from top to

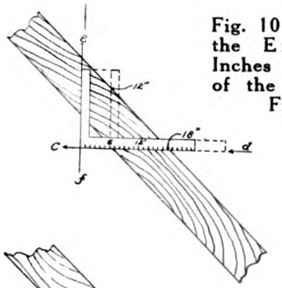


Fig. 10 — Getting the Extra Six Inches of Length of the Rafter in Fig. 9

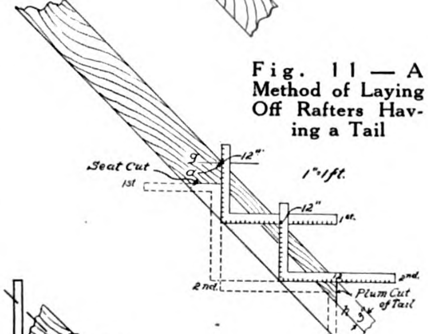


Fig. 11 — A Method of Laying Off Rafters Having a Tail

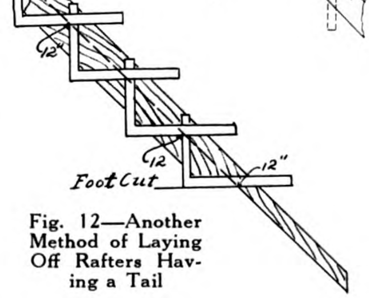


Fig. 12—Another Method of Laying Off Rafters Having a Tail

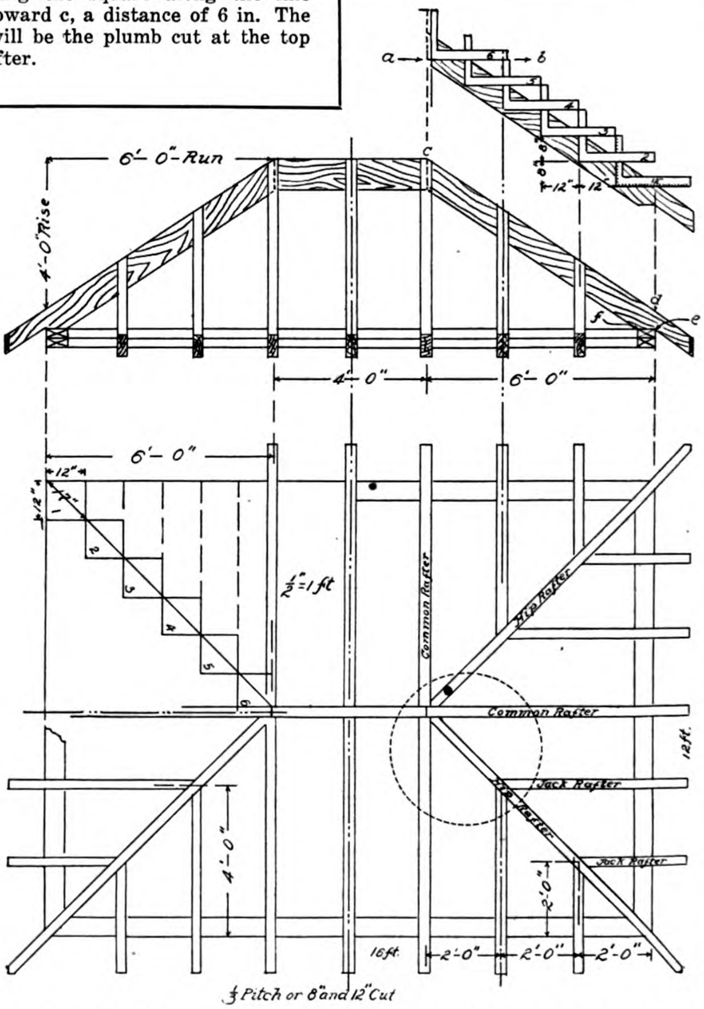


Fig. 13—Elevation and Plan of Plates and Rafters of Hip Roof

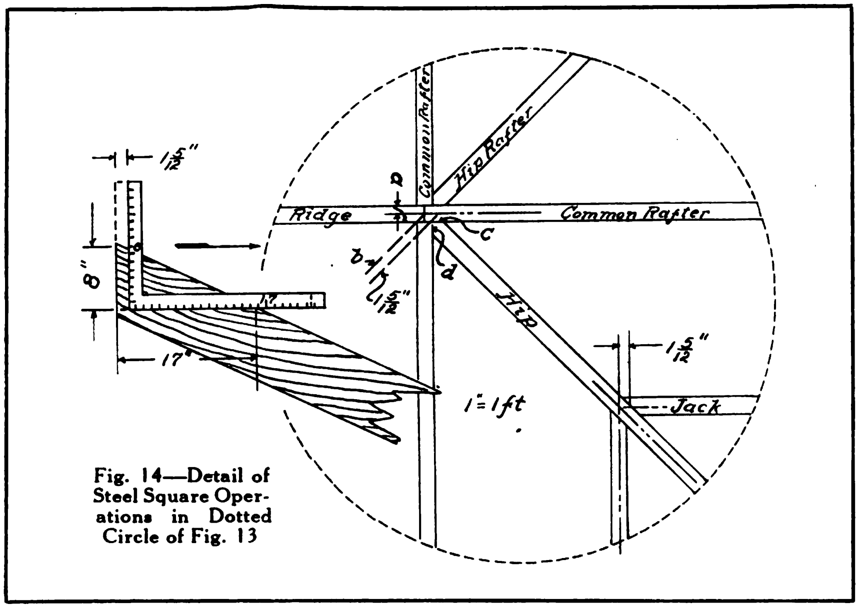


Fig. 14—Detail of Steel Square Operations in Dotted Circle of Fig. 13

bottom edge. To get the cuts for the tails apply the square twice measuring down the rafter from the point a shown on the projected rafer of Fig. 9 but better shown in Fig. 11. A line square down from the 12 in. mark on the second square in Fig. 11 shown by the second square represented by dotted lines, gives the plumb cut for the end of the rafter tail. Scribe a line g,h 3 in. in from the back of the rafter and where this line crosses the first square will be the point from which to square out as shown by the second dotted square, to give the seat cut. The rafter is ripped out along the line g,h to form the tail.

Another method of laying off rafters having an overhang or tail, is to scribe a line along the side of the rafter the same distance down from the back edge that the depth of the tail is to be, extending this the entire length of the rafter as shown in Fig. 12. The square is then used along this line instead of along the back edge of the rafter. This method is very handy on a plain gable roof where one rafter may be used as a pattern from which to mark out a number of others. On a roof having a big proportion of hips and jacks the large amount of scribing required becomes bothersome.

Generally the rafter tails are not cut off at the ends until the rafters are in place, when a line struck across the whole set brings the ends much evener than if cut separately before being put in place.

It is suggested that the beginner try out on a plank board the problems just gone over. Better still would be a small model of a plain roof cut to scale. Nothing fixes a thing in the mind more clearly than actually doing the thing. In laying out rafters with the square keep what is to be the top edge toward you. A stick with a slight bow is always used so that the bow will be up.

Fig. 13 represents the plan of the plates and rafters of a plain hip roof and above the plan an elevation. This roof is 1/3 pitch or 8 in. rise to 1 ft. of run. The rafters are spaced 2 ft. on centers. The building is 12 ft. x 16 ft. and 16 — 12 = 4, so the ridge pole will be 4 ft. long.

The three common rafters at each side and the common rafter at each end should offer no difficulty. As the roof rises 8 in. to each foot and as half the width of the building is 6 ft., then 8 on the tongue and 12 on the blade, used 6 times, will give the length and cuts of these rafters with the exception that we must cut half the thickness of the ridge pole from the top cut of the side rafters. The end rafters are full length. This is done by measuring straight back along the side of the rafter as at the top right hand of Fig. 13 where the square has been slid back one inch along the line a,b and in the direction of b. Applying the square six times gives the length from c to d only. The depth of the tail d,e and the foot cut f,e are found as in Fig. 11, using 8 and 12 instead of 12 and 12 on the square.

The small square in the upper left hand corner of the roof plan shows that for every foot of run for the common rafters, the hip rafter must run 17 in. as the distance from one corner of a 12 in. square diagonally across to the opposite corner is 17 in. nearly. While 17 in. is not absolutely correct it is near enough for all ordinary purposes. No attempt will be made anywhere in this article to take account of fractional parts of an inch so small as to be of no real moment.

Rise of hip rafter is the same as common rafter. That being the case, 17 in. on the blade and 8 in. on the tongue and applied 6 times will give the length of the hip rafter. The tongue gives the plumb cut and the blade gives the foot cut. The whole operation is shown on the projected rafter above the roof elevation Fig. 13. At the last application of the square it was slid along the line a,b in the direction of b for 1 5/12 in. which is half of the diagonal distance across the ridge pole. The reason for this is more clearly shown at Fig. 14 where that portion of the plan enclosed in the dotted circle is shown enlarged. The distance as shown at b is the amount that the hip must be shortened while half the thickness of the ridge measured square across as at a is the amount to take from the common rafter.

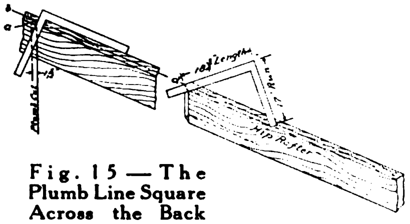


Fig. 15—The Plumb Line Square Across the Back of the Rafter

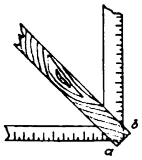


Fig. 16—This Illustrates the Necessity for Backing

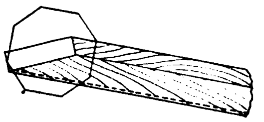


Fig. 19—Using an Octagon to Find the Backing of an Octagon Hip

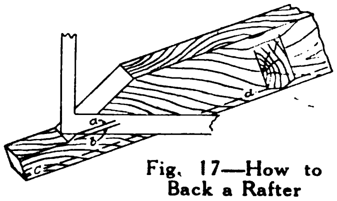


Fig. 17—How to Back a Rafter

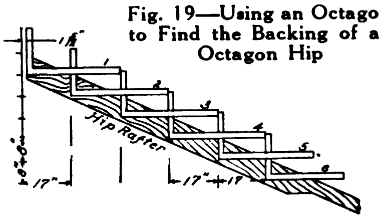


Fig. 18—Layout of Hip Before Making Cheek Cuts and Backing

Having the true length of the hip we must next obtain the side bevels or cheek cuts which are necessary to make a snug fit where the hip fits between the two common rafters as shown at c,d. The cut required is not a true miter or 45 deg. angle as might at first be supposed, for as the pitch of the rafter increases the angle does also. To find the cheek cut

of the hip measure across the square from 17 to 8 and it is found that a rafter having 17 in. run and 8 in. rise has a length of 18¾ in. Now taking the length 18¾ on the blade and the run 17 on the tongue lay the square across the back of the hip rafter, being careful to keep the measurements on the center line of the hip. The blade gives the cut. Fig. 15 shows at a the plumb line squared across the back of the rafter and b,c in the center line from which the cheek cuts are laid off as at d. If a piece of 2 in. material be cut off at a slant at one end and set over the heel of the square as in Fig. 16, the corners a and b project over the edge of the square. The same thing would happen where the foot of the hip rafter comes over the corner of the plate unless it was backed, as it is called, to remove this projection. The amount to be removed can be found by placing the square on the foot of the rafter as in Fig. 17. The distance a,b is then scribed along the top edge of the hip as from c to d and the wood from the center line of the hip to the line c,d is the amount to be removed from each side so that the roofing boards will not be interfered with by the raised edges of the hip.

Fig. 18 shows the layout of the hip before the cheek cuts and backing have been made.

Fig. 19 shows how a small octagon could be used to find the backing of an octagon hip.

(To be continued)

How to Make a Perspective Drawing

A Practical Method of Correctly Rendering a House in Perspective

By George Lawrence

The effect of distance upon the appearance of objects, causing, as it does, their apparent diminution in size in direct proportion to the distance they are from the human eye or a camera, is called perspective. Perspective drawing is the representation of this effect upon a flat surface. Objects drawn in correct perspective stand out natural and pleasing to the eye, and one gains at a glance an accurate idea of their shape and proportions.

The builder, architect, engineer, furniture designer, decorator and many others in the professions and trades are often required to execute and submit perspective drawings. Perspective sketches, too, are often of great value in some of the trades. This is especially the case in machine and wood-working shops. If an object is fairly simple in design, the workman can as a rule work to a perspective sketch, if it is properly labeled, more easily than he can follow a three-view scale drawing. The perspective sketch gives a general outline of the object at a glance, and this is what every workman must have impressed upon his mind before he can go ahead intelligently with any piece of work.

When it is desired to represent any large object or group of objects in perspective, it is first necessary to determine the point of view from which the object is to be observed—that is, whether it is to be viewed from above, below or on a level with the eye; also, whether one, two or three sides are to be exposed to view. An imaginary horizontal line on a level with the eyes we call the line of vision.

The line of vision for the average individual, when standing, is about 5 ft. 6 in. above the ground. Some objects come above this line and some below it, while others extend both above and below it. An ordinary table standing upon the floor, for example, comes considerably below the line of vision; therefore a perspective view of a table in this position will show the entire top surface to good advantage. The table, however, may be raised to a higher level so that it comes above the line of vision, and in this event the under side will be exposed to view, showing some of the details of construction. Buildings on a level with the ground one stands upon cross the line of vision; that is, part is below, part is above and part is on an exact level with the line of vision—see *D* in the accompanying drawing.

Ability to make a perspective drawing is a decided asset to the builder. Such knowledge will enable him to readily sketch out his ideas on paper so that his client can quickly grasp their meaning.

It is invaluable where the idea for a new porch, storm door, etc., is to be sold a house owner. Actual picturing of the results will always do much to close a sale.

After the line of vision is determined, one must choose the angle of view desired. A corner view will expose at least two sides to view, and this is usually just what is wanted.

In order to have a base line to work from, when one begins his laying-out on paper, the line *P P* (picture plane) is first drawn across the board. Then a plan of the object is plotted above this line so that one corner touches the line, as shown in sketch. If a 45-deg. angle view is desired, the object is plotted with its sides at an angle of 45 deg. to this line. In the example used herewith the plan of the house is plotted so that one side lies at an angle of 30 deg., while the front side lies at an angle of 60 deg. to the line *P P*. This side and front are then projected across and drawn in elevation, as shown at *B* and *C* respectively.

The third and last thing one must determine before he can proceed is to choose a station point or point of observation from which the object is supposed to be viewed. Here one must use good judgment. If the station point is located too close, the perspective will be too severe to look well, and difficulties will arise in laying it out. On the other hand, if it is too far away the vanishing points will be perhaps out of reach or too far from the drawing to show them conveniently on ordinary sized paper.

In the accompanying drawing the observer, stationed at *S*, is standing at a distance equal to a little more than the width of the house away as he views it at *A*. While this drawing shows only a straight-down view of the roof at *A*, an observer stationed at *S* sees the side and front of the house, the porch, part of the roof and part of the chimney. To him it looks exactly like the perspective drawing *D*. The station point *S* can, of course, be located a little nearer or a little farther away from the plan, at the option of the draftsman.

Now that the line of vision, the angle of view and the station point are located, one can go ahead with a perspective layout. In this example I have located the plan, the two elevations and the perspective view all in one compact drawing, in order to show clearly how every point and line is obtained, but this is not necessary in practice. The elevations may be on the same level and over to one side, or even on separate paper, and the perspective *D* may be drawn in below point *S* if desired.

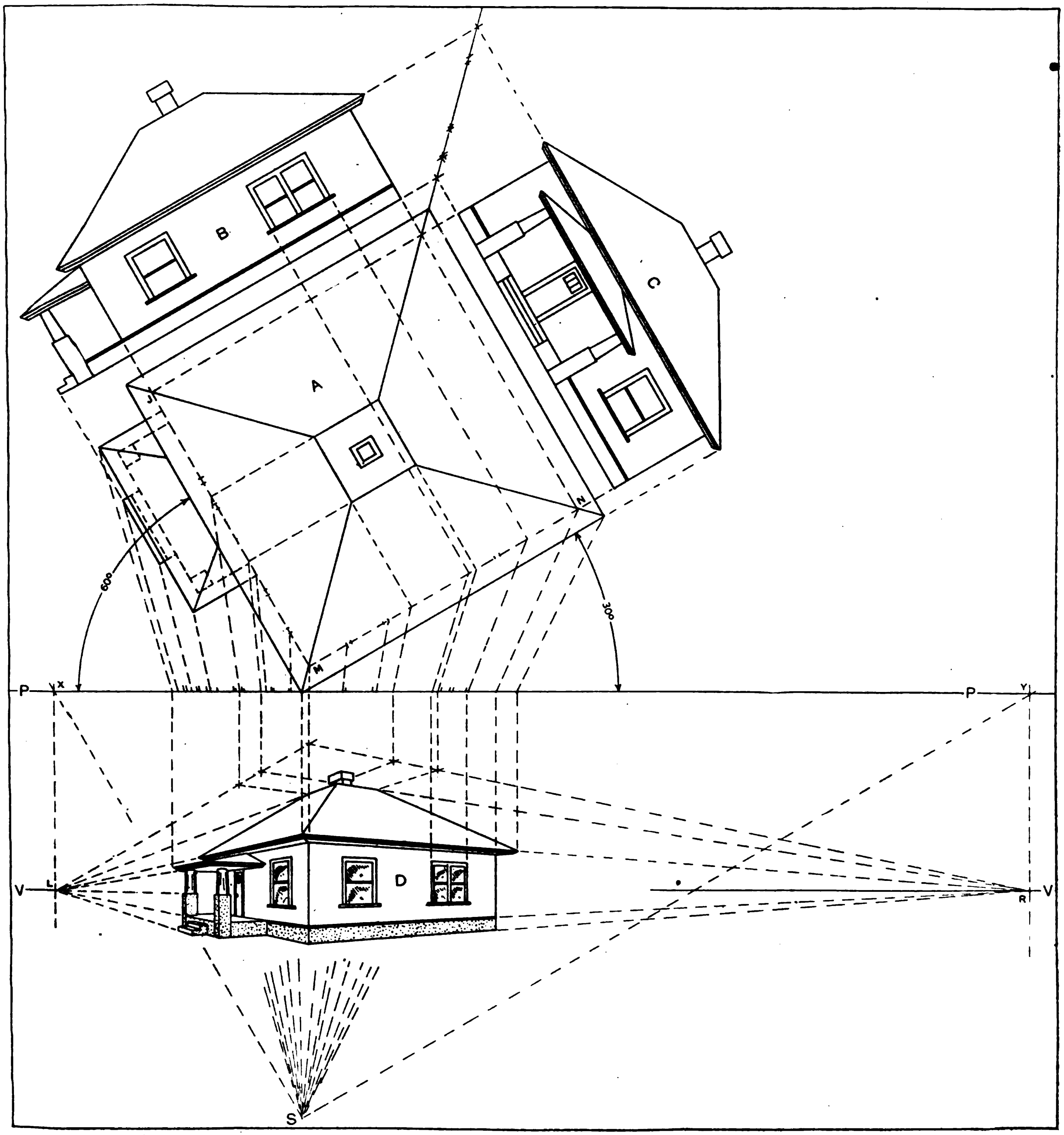
As stated before, the vanishing points (there is one at the left and one at the right for the respective sides) lie on the line of vision *V V*. The vanishing point for side *J M* is located by extending from *S* a line parallel to *J M*, so that

it intersects the picture plane *P P* at *X*, and then dropping down to *L* on the line of vision *V V*. Likewise the vanishing point for side *M N* is located by extending from *S* a line parallel to *M N*, so that it intersects *P P* at *Y*, and then dropping down to *R* on the line of vision, as shown.

The principal points in the plan *A* are now extended toward the station point *S* by dotted lines, and where these lines intersect the picture plane they are dropped down to develop the perspective drawing. These lines alone determine the width and length of the house and its parts in *D*.

The height of the house is determined by actual measurements laid off on the line of measure, which is the corner *M* nearest the observer. These measurements are taken directly from the elevations.

As a base to start from we have the line of vision *V V*, which, as we remember, is about 5 ft. 6 in. above the ground. We therefore locate the ground line of corner *M* on line *M S*, 5 ft. 6 in. below the line of vision *V V*, and let the height and other lines come where they will, according to the vertical scale measurements. The height of the porch, windows, roof, chimney, etc., are all laid off on line *M S*, and from the points thus located the lines are extended to right and to left, as required. Those extending to the left meet at *L* on the line of vision, and those extending to the right meet at *R*, also on the line of vision.—*The Wood-worker.*



An example in perspective. A is plan, B and C elevations, D perspective drawing, V V line of vision or horizon, P P picture plane, S station point of observer, L and R vanishing points and M S line of measure

Legal Department

All readers are invited to ask any questions whose solution will help them solve any legal difficulty that they may be in. Our legal adviser, George Kaiser, will answer direct by mail and give his opinion as to the correct procedure. Such of the questions and answers as are of general interest to the trade will be published in these columns.

All inquiries must be accompanied by the name and address of the correspondent, so that he may be answered direct or that he may be requested for further information if necessary to the intelligent answering of his question. No names will be published, only initials or a nom de plume. Remember that this service is free to subscribers.

Address Legal Department, Building Age, 243 West 39th Street, New York City.

Contractor Cannot Be Deprived of Right to Recover If Work Is Done • According to Specifications

A contractor engaged in the erection of a building is not to be deprived of the right to recover if the work required by the plans and specifications has been fully performed is the decision of the Supreme Court of Massachusetts in another recent case.

In August, 1910, the contractor received a contract to heat a schoolhouse. In September another party received a contract for the erection of the building. In November the system of heating was changed from hot air to steam. The court held that the contractor engaged in the erection of the building was not required to file the plans as that was the duty of the owner or the architect and their failure to comply with the statute did not deprive the contractor of his rights under the contract.

When Contractor Fails to Repudiate Materials Secured by Unauthorized Agent Is He Liable?

That contractors for a building who failed to repudiate a bill for materials ordered by a person who claims to be their agent until the time for filing a lien on the building has elapsed will be held to have ratified the agent's purchase, was the decision of the court in a late Washington case.

Suit had been brought to recover the balance claimed to be due for lumber which had been sold and delivered. The action was started by the Lumber Co. vs. the contractors. It appeared that the engineer, who was the superintendent of construction for the building being erected, had for three or four years previous been employed by the contractor and had superintended work which the contractor had done for the Lumber Co.

While the building was being erected, the engineer went to the Lumber Co. and purchased lumber from time to time on the contractor's credit.

When the Construction Co. learned that the lumber had been charged to it by the engineer, it did not repudiate his contract or advise the Lumber Co. that it would not be responsible.

After the work was completed, the contractor still did not repudiate the contract but advised that it was trying to have the company for which the building was being erected, take care of the Lumber Co.'s charges.

Six or eight months latter the contractor repudiated the engineer's contract and suit was started by the Lumber Co. for $311.69.

The court held that it was the duty of the contractor to have notified the Lumber Co. within a reasonable time of learning that the lumber had been charged to it, that the account was charged without authority by the engineer, as the Lumber Co. then would have had a lien on the building. The court therefore decided that although a repudiation at that time would have been valid as the time for claiming a lien had expired when the contract was finally repudiated by the contractor, the Lumber Co. was prejudiced by the delay and the repudiation was invalid.

Contractor Can Only Recover for Materials and Labor Used if He Breaks Contract

A contractor who fails to perform his contract to build a house can recover only the value of the materials used and labor expended if his failure to complete his work is a result of the owner's prior breach of contract, is the decision in a recent Mississippi case.

The court held that the money due the contractor by reason of changes in the original plans became due and payable at the same time and under the same conditions as money due uder the original contract.

It was also decided that an owner taking possession of an unfinished house does not thereby accept the contractor's work and become liable therefor as a house built on an owner's land becomes his property and he cannot be deprived of the use and enjoyment of his property.

Alleged Unconstitutional Ordinance Valid Where Health of People Is Concerned

An ordinance of the City of New Orleans which required the rat-proofing of all buildings and structures in the city for the purpose of preventing the introduction and spread of the bubonic plague was recently held valid by the Louisiana courts.

It appeared that the original ordinance covering this matter had been held to be unconstitutional by the courts because it contained no provision for notice to property owners and allowed health officers to discriminate between individuals.

The new ordinance on which suit was brought did not contain these defects so when the owner of a grocery failed to have his premises rat-proofed and set up the plea that the ordinance was null and void and unconstitutional because it was oppressive and deprived him of vested rights, etc., the court denied his plea on the theory that the health of the people is the first law of the land and declared the ordinance valid.

When Customs Are Not Universal Can They Be Understood as Part of Contract?

In a recent Massachusetts case it was decided that a usage or custom of the building trade that there be inserted in all contracts for the construction of Government buildings a provision that samples of material must be submitted and approved by the superintending architect before any material could be used, was not a custom of such general

and universal application that a corporation which wished to supply marble to a firm having a contract to erect a post office building must be presumed to have knowledge of it.

In this case a contract was entered into between a quarry company and a contractor which had a government contract to erect a post office building.

Suit was instituted to recover for breach of contract by the contractor who had agreed to use a certain grade of marble in the construction of the post office which the quarry company had contracted to supply. It was decided that the particular custom and usage mentioned above was not so generally known as to be binding on the quarry company.

Does Unsigned New Contract Abrogate Old Contract?

From S. B. C. Co., Va.—We have a contract to erect, superintend and build a church edifice 40 x 72 in plan on a 30 per cent of net cost of all expenditures.

Since signing of contract the building committee called a meeting and claimed they didn't understand said contract and prayed to us to please make the contract a lump sum. We agreed to do said work for $6,500, which was agreed upon by the parties of the first and also the second parts.

We then proceeded to make a new contract, asking them to sign. For some reason we don't know, they even failed to sign said new agreement, yet we continued to work on the old.

About three weeks later they came to us asking if we could continue said contract without the means to do so. We refused as we could see no surety of being paid for labor, and we stated to said committee that the only thing that we would be in a position to do would be to wait until they got money matters straight and we would be satisfied with $90 a week until they got ready to commence said work. Then after their agreeing to pay said amount, when we went to collect said money, their statement to us was that they thought we meant to continue to work with a force of men for said amount, and if we meant otherwise they wouldn't pay a cent and absolutely refused to pay up. Now since they have had us held up for at least three weeks they come back and want us to start up again without reimbursing us and after our having sent miles for at least three laborers of a skilled class, bringing them here.

What we want to know is this: What per cent of $18,000 would 30 per cent be, and also after we have drawn money upon the original agreement, which was 30 per cent of net expenditures of said work, would it or would it not be advisable to take work again without new agreement?

Answer—If the new agreement never became effective, as it would appear from your letter, you still have the right to proceed legally if necessary under the old agreement.

Thirty per cent of $18,000 is $5,400.

It is difficult to understand from your letter just what the situation is as between the parties at this time.

It seems as if it was merely a case of breach of contract, so I would advise you to put your claim in the hands of some local attorney and instruct him to collect what is due you for the breach.

Of course, BUILDING AGE cannot undertake to collect this money for you.

How the Builder Can Get New Business

Approaching Winter Offers Opportunity to the Live Wire

By Bricksand Mottor

"Well, Jones, what preparations are you making for winter business?" asked Jameson, traveling salesman for a big material concern, as he swung into the shop. "The first touch of autumn cold will soon be here. Are you making plans for getting some of the business that approaching winter generally brings?"

"I haven't really thought anything about it, Jameson," admitted Jones. "You see things around here have always been pretty dull in winter. What with this war and all, I don't see that there is going to be much of a chance for me to do anything."

"There are mighty few men in any line of business who are always on their toes looking for more business. Remember one big factor that makes for success in any business; that is, that there is always some business to be had. It may be lying dormant, apparently dead. But the man who goes out and stirs things up is bound to find some activity. It may be an entirely new line of work that must be developed; it may be a demand that nobody else in town has attempted to satisfy. Find that line or lines and work them to the limit.

"Take some of these specialties that are on the market now, vacuum cleaners, for instance. Do you realize that when the first one was put on the market, nobody knew anything about it or wanted to buy one? Now, not only is the portable vacuum cleaner no longer a rarity, but some progressive builders, catering to a high class, install a vacuum cleaning system in many of the houses they build.

"There are so many instances like that that you need not hesitate a minute to introduce some new fad here in your town. All you have to do is to work out your idea from every angle. And then go after the people who you know are good prospects for your idea.

There is one big factor that makes for success in any business: that is, remember that there is always some business to be had. It may be lying dormant, apparently dead. But the man who goes out and stirs things up is bound to find some activity.

"There's one idea worth remembering in connection with getting orders for such work. Start with the biggest and most influential prospect on your list. If you land him, and you will if you work it right, it will be easier to land the smaller fry.

"Another thing. If you want to sell any idea that helps domestic efficiency, try the woman of the house first. Don't try to sell her the idea alone; describe the idea to her in a way that will picture her using it.

"A salesman selling an expensive household convenience used this idea to perfection. Closing his demonstration he not only pictured the labor-saving features but wound up with, "My dear Mrs. Blank, I am not trying to sell you a vacuum cleaner. What I am doing is to offer you an extra hour each day, an extra hour that will enable you to get off early to the movies on Wednesday, that will enable you to enjoy the little pleasures now denied you by the care of your household duties. Think of what that will mean to you for the rest of your life!"

"Such arguments as that in selling any time- or labor-saving idea are worth while. For instance, if you try to sell the idea of a china closet built into the partition between living room and kitchen, opening into both rooms, picture the housewife as using it. Show how she can put soiled dishes in at the dining room side, take them out on the kitchen side, wash and dry them, and then place them back in the china closet without moving from the kitchen sink. What with the scarcity of help, many a well-to-do housewife would be glad to receive such a suggestion.

"Now is the time of the year when you can sell weather-stripping to good ad-

vantage. Many houseowners who burned ten tons of coal last year find themselves forced to enter upon the coming winter with seven tons or less. By going to such people, pointing out the fuel saving effected by weather stripping and showing them that they can save two or three tons by weather stripping or double windows, you will have little difficulty in securing an order. But always quote the price of the finished job.

"Many people who cannot be convinced of the value of weather strips will be readily converted to the idea of double windows, detachable for the summer time. Most people have heard of them and know something of their value in fuel conservation.

"Whenever you sell a person an idea that will save fuel, it is advisable to go a step beyond your job and see that the saving is probable by the way in which the furnace is fired. Make sure that the heating apparatus is in good shape and that the owner knows how to operate it to good advantage. If any repairs are necessary or some efficiency device, such as a temperature regulator is advisable, suggest the necessity for the work. If you can't do it yourself, recommend some heating man who knows how to do a good job. He'll probably be glad to give you a commission on new work like this if you take up the matter with him.

Work goes to the man who is out getting it. The big city contractors don't wait to be invited to bid on a job; they send a first class man to interview every architect or prospective builder. They often follow newspapers closely for hints of contemplated work, or subscribe to agencies making a specialty of collecting data on contemplated new construction. They don't wait for work to turn up, they go out and get it.

"Another good idea is to seek jobs for building storm doors for these colonial houses which have no porch. Storm doors like this should always be designed so as to harmonize with the appearance of the doorway and the house in general. They should be built in handy sections, screwed together. Thus the householder can put it up and take it down all by himself.

"In selling this idea, you might picture the opening of the door for friends who come in covered with snow, removing rubbers in the shelter afforded by the storm entrance, and then entering the house with no soiling of rugs. A housewife always looks ruefully at the muddy tracks left on her floor by the visitors in stormy weather.

"Then you can picture the elimination of chilling the house off by a front door left open while visitors shake off snow before coming in, or a last-minute conversation before leaving.

"Many small repairs will be suggested by your past experience. Think up every possible method of getting new business, then list your prospects and get to work.

"Believe firmly that it is possible for you to get new business this year and then go out and get it."

Country House Details—I

By A. Benton Greenberg
Architect

Walls usually carry greater loads than can be safely borne by the same area of soil upon which they rest. For that reason they are spread out at their base. The courses of brick or stone thus projected are called "footings."

Footings are of concrete or stone. If of concrete, the ingredients should be mixed in the following proportion: One part of Portland cement, 2 of sand and 5 of broken stone. In mixing the concrete care should be taken that the ingredients are properly measured and that the supply of water is uniform and of the proper amount to give the mixture the required consistency. The mixing must be thorough and should be continued until every particle is covered with mortar. The concrete should be deposited in layers not over 6 in. thick and should be rammed until the water flushes to the surface. Dumping concrete from a greater height than four feet will tend to separate the heavier materials, stone or other aggregate, from the lighter materials, sand and cement.

The trenches or pits dug to receive the concrete should be built to the exact dimensions of the footing, if the earth is hard and firm. If the soil is of soft clay or loose gravel, forms held in place by wood stakes and braces will have to be set up to confine the concrete. Later, when the concrete has hardened, these planks are removed.

Concrete footings should be 12 in. wider than the bottom thickness of the wall (see Fig. 1) and at least 12 in. thick for small masonry buildings and 8 in. thick for frame dwellings. In walls of more than two bricks in thickness brick offsets, as shown in Figs. 2 and 3, should be used to connect the foundation wall with the concrete footing. These offsets must be set back a distance equal to one-half the thickness of the footing. If laid in single courses, these brick projections should not be greater than 1½ in., and if laid in double courses, not greater than 3 in.

This article is the first of a series covering the construction of country houses. Approved methods of constructing all parts of a house will be illustrated and described, brick, frame, etc., all being treated.

Such a series as this will furnish any builder with valuable data that is worth watching for. The plates are all thoroughly practical, drawn up by a well known architect, and indicate good every day practice.

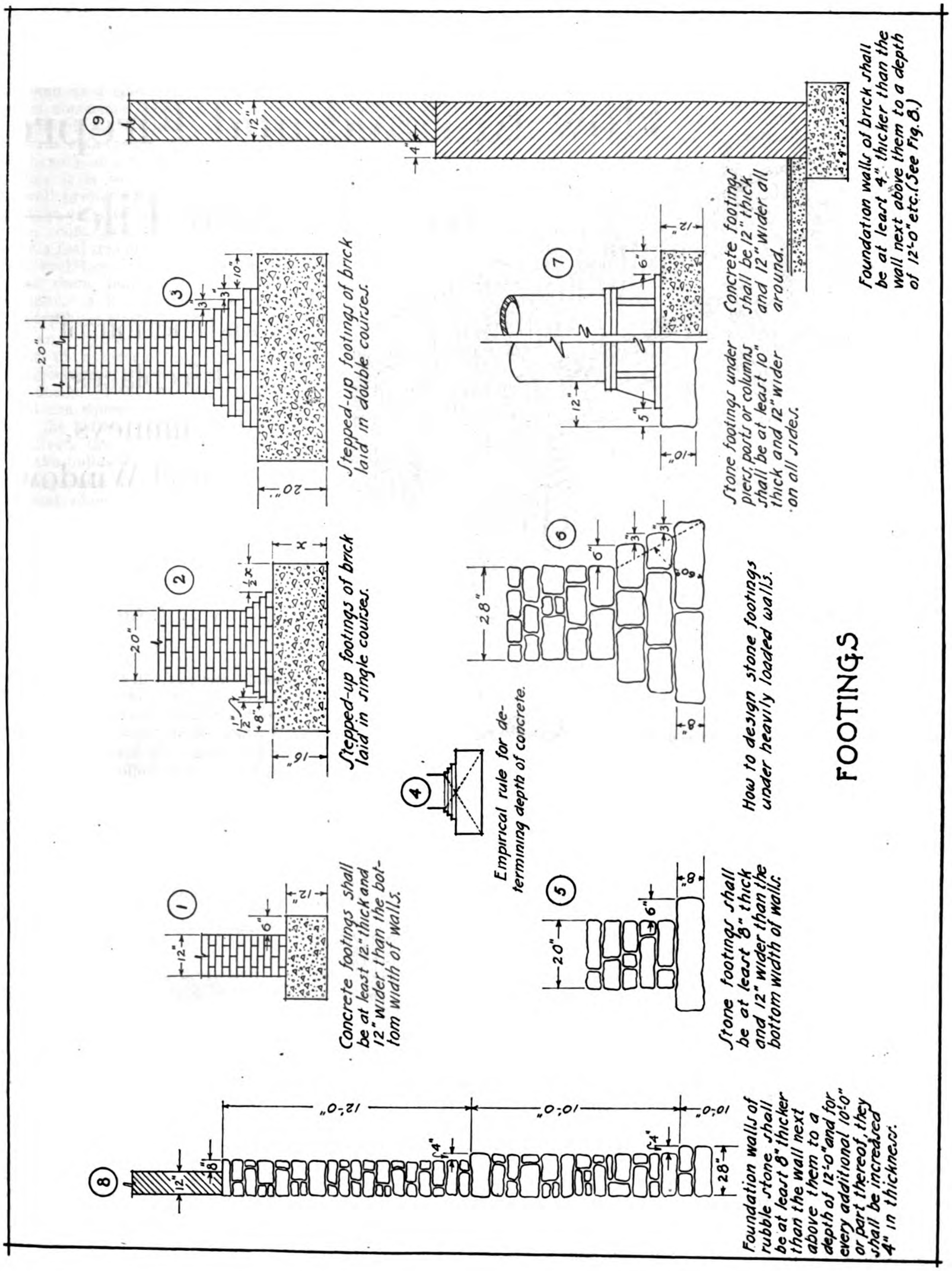
Stones used for footings should be hard and as large as possible. In no case shoud they be less than 2 x 3 feet. They should be laid crosswise, on a level surface and well bedded in mortar. The trenches for these footings should be at least 6 in. wider than the bottom width of the footings, to allow the outer surface to be well pointed.

Figs. 1 and 5 give only the minimum width and thickness of concrete and stone footings respectively. But if greater widths than those specified are required, they are designed as follows: To obtain the width of a wall footing, calculate the weight per lineal foot of wall and divide by the safe bearing capacity of the soil per square foot. To find the width of a column footing, divide the total load carried by the column by the safe carrying power of the soil per square foot. To illustrate: A column carrying a total load of 120 tons is supported by a footing which rests on soil composed of a mixture of sand and clay. Such soil, according to the New York Building Law, has a bearing capacity of 2 tons per square foot. Hence, dividing the total load (120 tons) by the allowable pressure on the soil (2 tons per sq. ft.) will give the area (60 sq. ft.) of the bottom of the footing. The square root of the area (7 ft. 9 in.) will give the length of each side of the footing, if square.

If stone footings are used, the steps or "batter" may be determined empirically as follows: From the edges of the bottom of the wall draw lines at angles of 45 deg. or 60 deg. until the horizontal distance separating these lines is equal to the width of the footing, calculated as explained in the preceding paragraph. Then draw the steps touching

these inclined lines, as shown in Fig. 6.

Fig. 4 illustrates a quick method of finding the depth of a concrete footing. Ascertain the width of the footing and its distance from the base of the wall, as explained in the last two paragraphs. Then draw lines connecting the edges of the base with the opposite ends of the base of the footing.



Foundation walls of brick shall be at least 4" thicker than the wall next above them to a depth of 12'-0" etc. (See Fig. 8.)

Stepped-up footings of brick laid in double courses.

Concrete footings shall be 12" thick and 12" wider all around.

Stone footings under piers, posts or columns shall be at least 10" thick and 12" wider on all sides.

Stepped-up footings of brick laid in single courses.

How to design stone footings under heavily loaded walls.

FOOTINGS

Empirical rule for determining depth of concrete.

Concrete footings shall be at least 12" thick and 12" wider than the bottom width of walls.

Stone footings shall be at least 8" thick and 12" wider than the bottom width of walls.

Foundation walls of rubble stone shall be at least 8" thicker than the wall next above them to a depth of 12'-0" and for every additional 10'-0" or part thereof, they shall be increased 4" in thickness.

Department of Masonry Construction

CONCRETE, BRICK, ETC.

Practical Ideas Which Will Help You Do A Quicker and Better Job

How to Build and Fireproof with Hollow Tile—VI

Construction of Fireplaces, Chimneys, Oriel Windows, Etc.

By J. J. Cosgrove

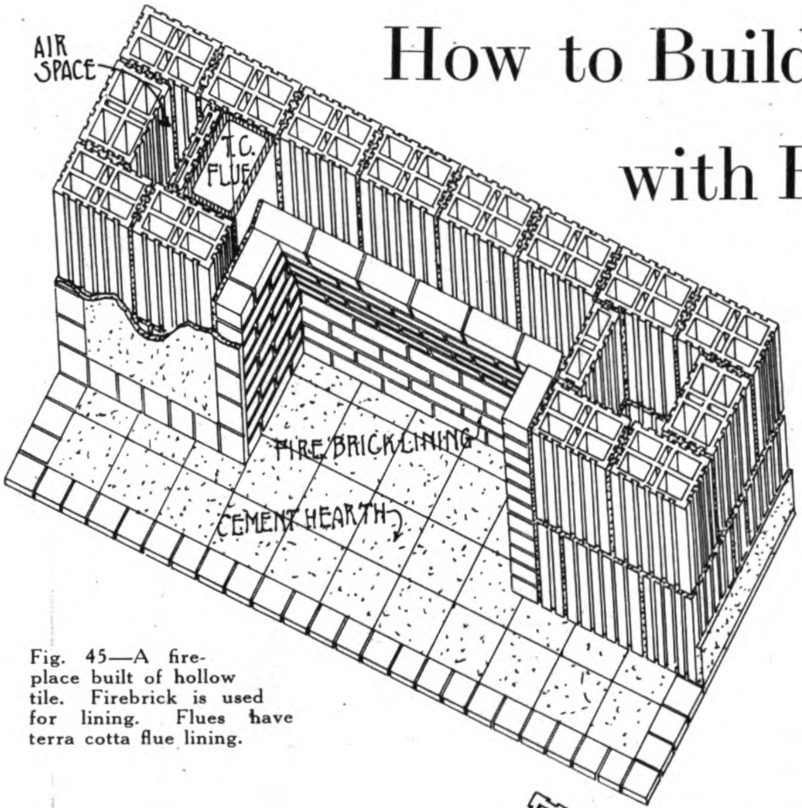


Fig. 45—A fireplace built of hollow tile. Firebrick is used for lining. Flues have terra cotta flue lining.

Seeing is said to be believing, and if first sight is not always convincing, seeing things being done or how they have been done, is at least a very good way of learning what to do. For this reason a couple of installments will be devoted to showing pictorially how to construct special features of buildings out of hollow tile.

In the home no feature adds so much to the cheer, perhaps, as a fireplace. The building might be heated with steam, hot air or hot water, but unless there is an open fireplace in the living room there is no shrine around which the family can gather and be satisfied. Gazing at the flame of a wood fire or the glow of a coal fire is pleasant occupation, and one can never be lonesome, even when alone, in a room or building which boasts the companionship of an open grate fire.

In residence buildings of hollow tile we must, then, still have our fireplaces, and in Fig. 45 is shown how one may be constructed. All fireplaces, whether built of hollow tile, brick or other masonry material, should be lined with fire brick. This will preserve the fireplace during the life of the building from being burned out, as common brick, particularly soft-burned brick, are liable to burn out under frequent and high-temperature use.

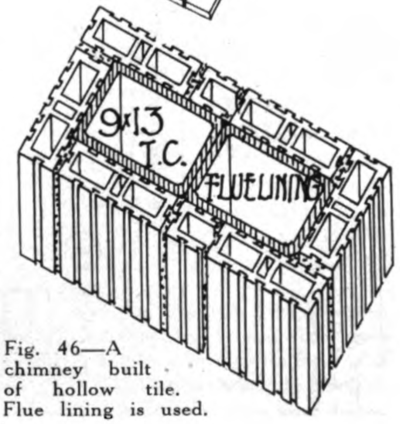


Fig. 46—A chimney built of hollow tile. Flue lining is used.

Terra-cotta flue linings must be provided in the wall to serve as a smoke flue, and the terra-cotta linings must be made tight at the joints or the draft of the fireplace is liable to be spoiled by leakage of air where the joints are not tight. Then again, when a fire is first started in the autumn and the chimney is cold and damp the draft will be sluggish or negative, and smoke and gas will leak through the unmortared joints and through the walls of the building wherever there are crevices through which it can force its way.

The terra-cotta flue linings ought to be backed up with hollow tile or brick, and it is well to put a damper in each fireplace so the draft can be shut off from the smoke flue when desired. Many rooms have been hard to heat, and the buildings consequently hard to rent, because large fireplaces opening into them had no means of checking the draft in extremely cold weather; under such conditions, if the fireplace is not in use, the

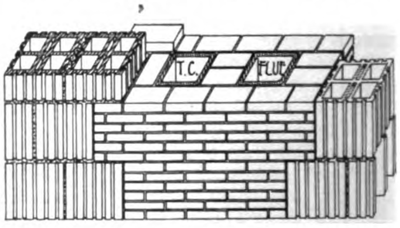


Fig. 47—In chimney construction brick can often be advantageously used in connection with hollow tile. This illustration shows a good practical combination of brick and hollow tile. Note how the brick is bonded into the tile; the same method can be used to bond a brick pier into a hollow tile wall.

heat of the room will escape up the chimney and it will be impossible to keep the room warm.

Chimneys are important details in every building, and a hollow-tile chimney is shown in Fig. 46. This is a two-flue chimney, lined with terra-cotta flue linings, and backed up with ordinary hollow-tile building blocks.

A chimney is a more important feature of a building than is generally realized, and as a consequence too little thought is sometimes given the subject when planning a building. From an architectural standpoint, it can make or mar the beauty of a building, depending on whether it is well placed or poorly placed; well proportioned or poorly proportioned, or extends too little or too far above the roof. It is one of the most conspicuous features of an ordinary home and some architects have been known to accentuate them, building the fireplace and chimney, as it were, and subordinating everything else to them.

From an engineering or practical standpoint, the subject of chimneys is of no less importance. On the right proportion and design of the flue depends the draft, and consequently the heating efficiency, of the boiler or furnace, and this in turn affects the comfort, the habitability, of the building.

It is important that a chimney be straight and smooth inside and proportioned to the area of the grate or the stove, range, boiler or heater. Only one smoke pipe should be permitted to connect to any flue, and no other openings should lead to it or it is liable to spoil the chimney draft.

Chimneys, whether of hollow tile or any other form of construction, should be cased with flue linings to give them a smooth interior surface. The best form for flue linings is round or oval, as smoke and hot gases pass up with less frictional resistance in a round flue than a square one. Square flues, on the other hand, are much more efficient than rectangular ones, on account of the less surface exposed for a given area of flue. For instance, a flue 12 x 12 in. has an area of 144 sq. in. and a perimeter of only 48 in., while a flue 8 x 18 in., having an equal area, has a perimeter of 52 in., thus presenting four additional inches to offer resistance. No satisfactory formula has ever been devised to calculate the area of smoke flues under varying conditions. A simple empirical rule that will be found satisfactory for ordinary purposes is to allow in the smoke flue an area equal to one-eighth the sectional area of the grate. Chimneys for fireplaces to burn wood or bituminous coal should have an area, respectively, of one-eighth and one-twelfth. If the fireplace is for burning anthracite coal, one-twelfth.

Brick can often be used to good advantage in connection with hollow tile in the building of chimneys, both for architectural effect and for practical results. A good practical combination of brick and hollow tile is shown in Fig. 47. This shows the method of bonding the brickwork of a chimney into a wall of hollow tile, but the same method may be employed for bonding a pier of brick or the casing of a doorway with the body of the wall.

This illustration shows something else well worth bearing in mind. That is the solid way in which the flue linings are bedded in a solid wall of brick. If the bricks have been properly laid, the flue linings are solid and without cracks or breaks of any kind, and the joints all well set in a good Portland-cement mortar; this form of construction will last for ages, never leak, and always give the very best of service. Another feature of this construction which can be commended to the builder who is anxious to do good—and better—work, is the way the flue linings are kept separated. Too often in building a chimney the mason will bunch the flue linings in a group, four, six or eight together with nothing between. That is very bad practice for more reasons than one. In the first place, when the flue linings are bunched in that manner the joints are never tight and cannot be expected to be tight. The result is a great loss of draft in all the flues. In the second place, when a number of flues are bunched together without partitions between them, the wall is weakened greatly at that point for there is no cross bracing such as there would be if four-inch walls divided each flue lining from the others. This matter has been the subject of consideration by framers of building codes, and in many cities now they require that all flue linings have around them at least 4 inches of brickwork and that a 4-inch partition be built in the walls between all flue linings.

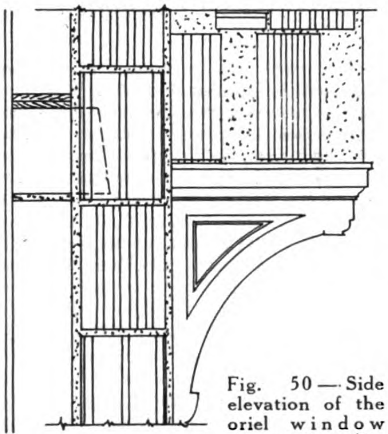


Fig. 50—Side elevation of the oriel window shown in Fig. 48, illustrating the ornamental faces of the brackets and the floor slab, which are formed by pouring.

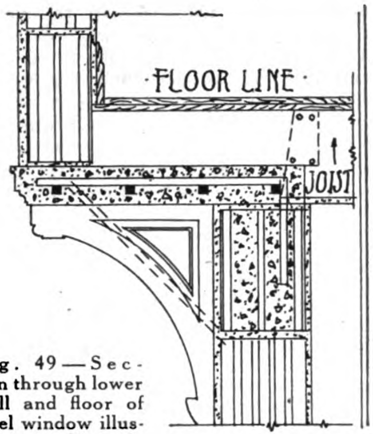


Fig. 49—Section through lower wall and floor of oriel window illustrated in Fig. 49. The weight of the window is carried on a reinforced concrete slab cast in place, which is supported by reinforced concrete brackets also cast in place.

Another interesting detail of buildings is an oriel window or a bay window. In Fig. 48 is shown in plan an oriel window commonly called a bay window. As there seems to be some confusion in practice as to just what constitutes a bay window and what an oriel window, it might not be amiss to point out the difference here.

A bay window, then, is one which projects outward from the wall of a building and commences at the ground. An oriel window, on the other hand, is one which projects outward from the wall of a building but which starts from and is supported by brackets or corbels from the wall above the ground. A bay window might extend the full height of the building, or be only one story in height. An oriel window might extend the full height of a building above the first floor, or it may be only one story in height. But if only one story in height a bay window would have to be on the ground floor, and resting on the ground. An oriel window might be at any floor of the building and would be supported from the wall by means of floor extension, corbels or brackets. From the floor plan it will be seen that the hollow tile, when used in forming an oriel window, do not fit to-

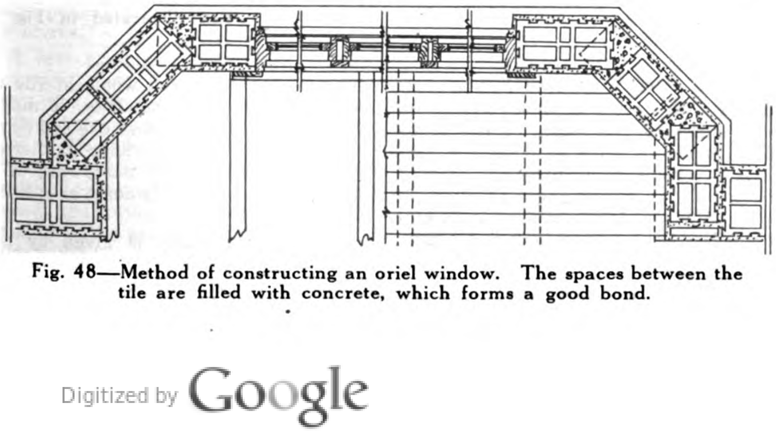


Fig. 48—Method of constructing an oriel window. The spaces between the tile are filled with concrete, which forms a good bond.

gether as in a plain wall, so the spaces between must be filled with concrete. The corners are well bonded together, however, and the construction is a sufficiently strong one.

A section through the lower wall and floor of the oriel window is shown in Fig. 49. It will be noticed that the weight of the window is carried on a reinforced concrete slab cast in place, which in turn is supported by reinforced concrete brackets, cast in place and bearing on the wall. In Fig. 50 is shown a side elevation of the oriel from which can be seen the ornamental faces of the brackets and the floor slab which are formed by pouring or casting.

In the laying of tile in the walls of a bay window or oriel window, brick can sometimes be used to very good advantage instead of concrete for filling the chinks. When they are used, however, they ought to be laid in a good bed of Portland cement mortar and all crevices flushed in with grout, not only to keep the building warm, but to insure a good strong construction which will so interlock with the tile as to lend strength to the wall and be in no danger of falling out.

Why Chimneys Have Poor Draft

Approved Methods of Improving Draft are Illustrated and Described

By Harrison Fielding

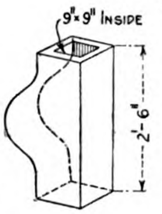


Fig. 1—A small double bend of fireclay is sometimes built into the flue near the top to act as a pocket to catch downdraft.

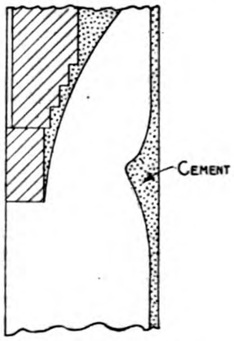


Fig. 2—Method of improving the draft of a fireplace by narrowing opening by smoke shelf.

In order to secure a proper draft for the kitchen stove, the furnace or the open fireplace, it is necessary that the flues of the chimney be of proper construction, otherwise smoky rooms throughout the house are likely to result.

It is agreed by most people that fireplaces arranged on inner walls with the flues brought up together inside the building and cutting the roof near the ridge, are likely to give far less trouble than fireplaces built on outside walls. Their best claim is to a minimum of exposed surface, thus keeping the flues dry and warm, especially when the kitchen or other flue in use is in the stack.

With a fireplace on an outside wall the whole of the flue is exposed to wind and rain. Such flues are often arranged for esthetic reasons, and as one safeguard against smoking, the backing to fireplace, if of brickwork, should be 14 in. thick, and if of stone 18 in., and the flue itself should be not less than 9 in. thick (12 in. stone). A damp-proof course of lead or bitumen should be inserted in all chimneys just above the roof to arrest damp. This, of course, has little effect on an outside chimney where such a large area is exposed to the weather. Dryness and warmth are important in all flues. This will be noticed in first lighting flues in the autumn, when flues which have drawn well the previous winter are sluggish and inclined to smoke. This is solely due to cold, damp air in the flues, against which the light, heated air finds it difficult to force itself. The flues in a newly built house often smoke at first for a similar reason until the flues are properly dry.

The flue's worst enemy, however, is downdraft, that is, sudden, inexplicable downdriven eddies of wind caused by surrounding high trees, roofs or hills. It is very frequently met with in cities, where flues are affected by neighboring high buildings, the fireplaces on the uppermost floors suffering the most. Flues in all buildings should have at least one bend in their length from fireplace to roof. This should be at an angle of 40 to 70 deg., and be gradually worked over with no quick angles so as to form a minimum of resistance to the smoke ascending, at the same time baffling any downdraft. The position of this bend is arranged according to the general construction, perhaps half-way up being the most suitable, as it serves two purposes in a flue, namely, for stopping rainfall and downdraft at the top, and for quickening the draft above the fireplace opening.

A very useful article on the market is a small double bend of fireclay, shown in Fig. 1, and which is built into the flue near the top to act as a pocket to catch and annul downdraft. A similar baffle can be arranged just over the fireplace opening and rendered out in cement mortar as in Fig. 2. The sloping of the upper portion prevents soot collecting, and the narrowing of the opening causes a quicker draft.

The size of the flue, which for average brick chimneys is 9 in. by 9 in., should be kept the same the whole of the way up. Near the top, however, it may be narrowed, as the warm smoke has by now cooled and contracted, and a smaller outlet is desirable. This narrowing of the flue should be carefully done, as it is easy to hinder the draft.

Too little thought is given by most architects to the size of their flues, and whatever the size of the grate or form

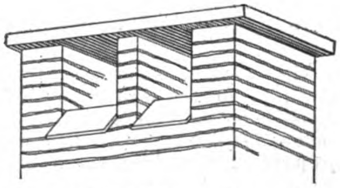


Fig. 3—Sometimes the side walls of the chimney are carried up, a stone slab being laid over the top so as to prevent downdraft.

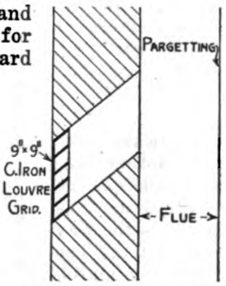


Fig. 5—An opening may be cut above 9 inches below the top of the chimney.

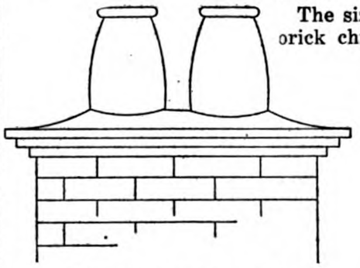


Fig. 6—A chimney top of good architectural appearance.

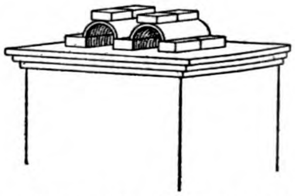


Fig. 4—Another method of accomplishing the same result illustrated in Fig. 3.

of fireplace, the flue is seldom made larger than 9 in. by 9 in., excepting, perhaps, the kitchen flue. Large fireplaces with open hearths having a dog or basket grate with fire back require 14-in. by 9-in. flues. Should "smoking" occur with this type of fireplace a test hood of rough deal can be fixed over the grate and altered by lengthening or narrowing until found satisfactory, when it is replaced by a permanent one of bright iron or copper.

All fireplaces should have separate flues; any connection between them, as in this case of bedroom flues on a top floor, causes unpleasantness in the case of one of the fires being in use and a gust of "downdraft" blows the ascending smoke down the adjoining flue.

The flues in some of the stone buildings in Scotland are formed circular—a shape which enables them to be thoroughly swept. Brick chimneys are sometimes built a similar shape with 9-in. circular firebrick linings. The expense of these has prevented their general use.

The cause of many fires burning sluggishly is want of sufficient air, particularly in rooms where the occupiers close up the windows and doors. The burning fire consequently sucks air in through cracks by the window and under the door, thus causing the drafts for which the builder is blamed. Preparations against such trouble can be made by a small length of gas piping from the outside air taken under the floorboards and opening just under the bars at the back of the grate. From this the fire could draw its air supply.

No flue in a stack should open to the air at a lower level than an adjoining one, as this would be strongly provocative of downdraft. By-laws rightly require that chimney stacks should be at least 3 ft. high above the ridge line. Downdraft may sometimes be cured by adding a few more courses to the height of the stack, or the withes alone can be carried up and finished on top with a stone slab to baffle downdraft and rain, and endeavor to obtain a cross-draft as in Fig. 3. This makes a picturesque finish, and is often seen in Wales and the West Country.

In the Midlands a half-round ridge tile is similarly used for the same purpose, being bedded in cement and weighted down on top with a brick as in Fig. 4. Another scheme for preventing downdraft is to cut an opening in the flue about 9 in. below the top and insert a 9-in. by 9-in. cast-iron louvre grate as in Fig. 5. The shape of this creates an upward draft. A cheaper form of the same principle can be carried out with air-bricks.

A less expensive method of treating downdraft than by building up the brickwork of a chimney is fixing a "tall-boy," a "smoke-curing" pot, or a revolving cowl. Worthy inventions as some of these no doubt are, the appearance of the majority is against their general use for houses and cottages. The least offensive-looking is the ordinary 12-in. pot, Fig. 6, which, heightening the flue and narrowing the outlet, is often found a sufficient cure.—London *Building World.*

How to Make Old Foundation Walls Look Like New

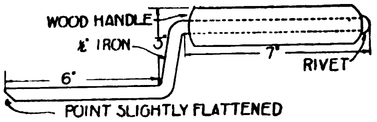
By E. V. Laughlin

It is a relatively easy matter to renew an old brick or stone foundation so that it may look just like new. A mason in my employ does this work for me. The expense is relatively small and the advantages many. I describe the method this mason employs, for I believe many builders may wish to avail themselves of this way of beautifying an old house that is undergoing repair.

The first step is to thoroughly clean the foundation from the watertable down of all dirt, loose mortar or crumbly material. The mason hammers the wall thoroughly to detach all material of this kind. Next he sweeps with a stub broom to make sure that no loose material remains. As a last step he washes with water. Generally he uncovers the wall for a depth of 6 in. below the soil line. This done he is ready to begin the work of surfacing.

The plaster material is made of screened sand and cement in the proportion of two parts of the former to one of the latter. These are thoroughly mixed dry in a mortar box and moistened as used. With a plasterer's trowel he applies the mixture to the wall, coating the same to a depth of about one-quarter of an inch. Of course he spreads across pockets or depressions that may exist in the wall. In troweling he works upward rather than downward, thus effecting a surer bond between the wall and the mortar.

After the mortar has hardened for about 30 minutes he "floats" the same, using water and a stubby brush. This process removes the trowel marks and imparts a richer appearance to the surface. It also seems to overcome the tendency to check or crack. A few moments later he marks the wall to make it resemble stone. In doing this he uses a 6-ft. level and a marker made by the local blacksmith. This is merely a rod of ½-in. iron bent as shown in the sketch and provided with a handle. These marks, of course, may be of any particular pattern. For large buildings I have observed that a horizontal length of 2 ft. and a vertical width of 1 ft. produces a desirable effect. For small buildings I would suggest a length of 18 in. and a width of 9 in. The effect is considerably heightened if the indentations are later painted or stained with black paint. However, this feature is purely optional.



A handy tool used to mark joints in a wall.

Not only does a foundation treated in this manner look a great deal better, but it is made much more weather resisting. Rain and snow is effectively shut out, and the tendency of moisture to penetrate very much lessened. The evidence indicates that the basements within are much less likely to freeze.

It is not a difficult thing for a mason to learn to do this work. The mason referred to was able to do very satisfactory work after he had practiced but a few hours. The difficult thing is to learn how to keep the mortar from falling off when it is first applied. However, one soon acquires the particular "twist" by means of which this is done. And if the wall has been initially well prepared for the mortar it will stick with a grip that knows no loosening.

Economical Construction of Concrete Foundation Wall

The Block Is Made in Place on the Wall

By D. W. Daley

The method of operation is as follows: The corner guide boards are first set in position and made plumb and braced as indicated by the illustrations, which show the method of erecting a garage. The object of the guide boards is to keep the wall plumb. The guide boards have holes each 6 in. in height, so as to admit of a line being stretched from corner to corner to aid the operator in keeping the wall in alignment.

The wall is started by placing the bot-

A row of attractive houses with foundations built by this method.

tom mold board on the ground and bracing it in the usual manner, and after the wall is one board high the brackets will hang on the wall. Where a wall stands clear of other objects the brackets are used in pairs of two each. One bracket is hung on each side of the wall and secured together with a ¼-in. bolt with a nut on one end and a head on the other. By the nut the brackets are adjusted to gage the proper thickness of the walls.

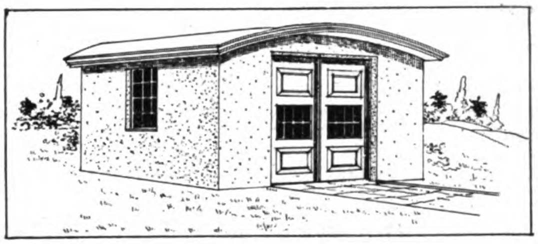
After the brackets are adjusted the mold boards are set in place and are then ready to receive the concrete, which is used in a wetter consistency than it is customary to use in the manufacture of concrete blocks. As the concrete is being deposited it is solidly tamped.

As soon as the concrete is put in place the mold boards are removed and placed in a new position on the walls as described above.

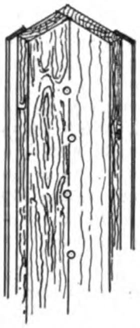
I have built many foundations by using for mold boards two of the first floor joists. The wastage of form lumber is reduced to zero. It requires a very few moments to place the mold boards in position.

I also veneer walls with tile mosaic and crushed marble or granite. To veneer a wall the mold board is laid flat and the materials to be used for veneering are secured to the mold board by an adhesive. Then the mold board is put in place and the concrete that is used next to the veneer is made rich with cement and rather damp to insure a secure bond. When the mold board is to be removed, a wire is pulled between the mold board and the veneer. One end of the wire is above and the other end is below the mold board and the operator pulls on both ends of the wire, passing it from end to end of the mold board.

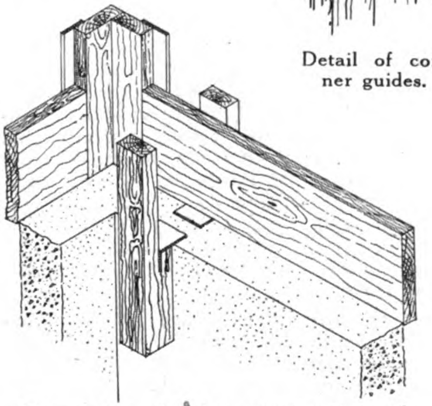
When I build a wall against a bank I place a properly braced post in the bank which has nails in the side to receive a double wire which holds the bracket in position, instead of the bolt as described above where the brackets are used in pairs.



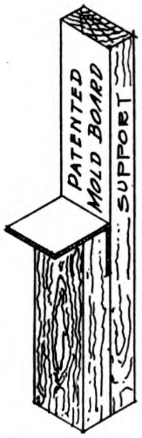
Perspective of garage whose erection is described. For labor, the cost of walls up to roof was $32.50.



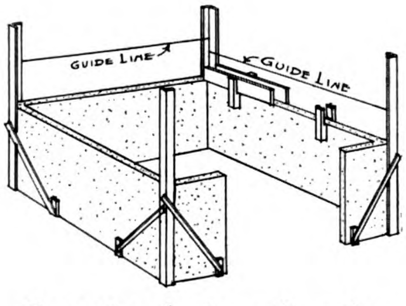
Detail of corner guides.



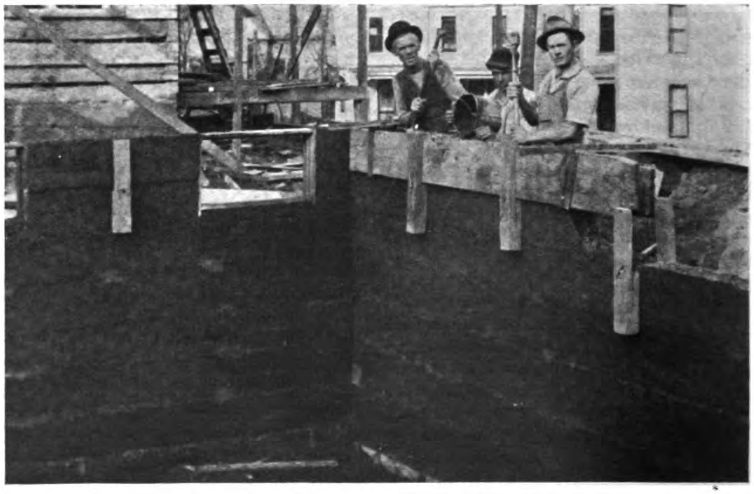
Perspective showing construction of corner, use of mold boards, and forms.



Detail of mold board used to hold up forms on the wall.



Perspective showing walls under construction.



Photograph taken of walls under construction.

THE EDITOR'S PAGE

How Will the New Restrictions Affect Building?

Are the government restrictions on building as drastic as first thought would seem to indicate? Will building be practically killed?

There is ground to believe that building will be stimulated rather than hindered by the order. The result is almost certain to be a speeding up of essential work, merely causing the cessation of work that is unimportant, which work should not be tolerated during the present emergency.

Any architect or builder who has tried to put through an important project not directly connected with the winning of the war will testify that his work has been held up for lack of materials and labor. If a trip to Washington were logical as the sole means of getting through absolutely essential materials, the discovery was made that hot air was all that could be obtained. There was no centralization of authority; this lack is remedied by the new regulations.

The new regulations are going to practically guarantee materials to the work which is authorized as essential. This work will go ahead, rapidly and undisturbed. All other work will be eliminated.

The past few months have already eliminated much unessential construction, only that being undertaken which was absolutely necessary. The monthly statistics gathered by BUILDING AGE show that construction is now at its lowest.

Therefore there is every occasion to believe that the only result of the government's regulations will be the speeding up of authorized buildings.

The farmer, as an essential factor in the winning of the war, will in all probability be encouraged to build wherever necessary.

Buildings needed to insure better sanitation and decent housing facilities are not under the ban, says Mr. McAdoo.

Additions or remodeling jobs costing under $2,500 will likewise be permitted. This particular clause, however, does not mean that any small building will be permitted without license, but only that additions and remodeling costing under $2,500 can proceed without a license.

It should be remembered that the state councils of defense really are the deciding factor in the granting of licenses, although this power is nominally in the hands of the War Industries Board. These councils are made up of citizens of the states in which they operate, and their interests are in the betterment of their own communities, next to the winning of the war. Applications will therefore be treated sympathetically and with due regard for local conditions.

There is, therefore, good grounds to believe that the new regulations will not hinder building, but actually will rather speed up building in general.

WHY THE EDITOR IS GOING TO ENROLL IN THE FOURTH LIBERTY LOAN ARMY

The Liberty Loans are to me more than an investment in this war. Rather do they hold a deep feeling of a lending for the immediate fraternalization of humanity and for the protection of the common interests of this generation's great grandchildren, both here and abroad.

Fully indeed do I recognize the fact that an immediate and urgent need requires that I loan more than I can afford. Every dollar that I loan helps to make more efficient and safe such of my friends as have been called to the colors.

These considerations, which are to a certain extent the crystallization of our war aims, force me to take bonds in the Fourth Liberty Loan, not only for the welfare of those who have worked and played with me, but also for the preservation of my self respect. It would be hard indeed for me to look my friends in the face on their return, knowing that I had in any way failed to do my utmost here on the home front.

I believe that fundamentally most of us left in civil life contribute to the Liberty Loans because of pride in their country, their friends and the preservation of their own self respect. The bond payments may be hard and self-denying, but the results of the future far surpass the present merely money privation. The money is certain to come back two-fold; any mental satisfaction would be lost forever.

Frankly, I would hesitate long indeed before subjecting myself to the mental torment that after the war days would bring if I did not do my share now.

Therefore I am going to join the army of those who from a firm feeling of pride in their country, their friends and themselves, enroll in the Loans that are slowly opening the golden gates of Liberty and Freedom to humanity's children.

Will you enroll there with me?

ERNST EBERHARD,
Editor.

The Government Restricts Building

The Government has taken a most drastic step in the curtailing of building operations, announced in a recent order. Directly bearing upon the interests of the building contractor is the clause stating that all construction work costing over $2,500 can only proceed after the obtaining of a license.

The procedure that must be followed by a contractor who desires to start a project costing over $2,500 is as follows. It was worked out between the Council of National Defense and the War Industries Board.

"Any person interested in a construction project must apply, with a full statement of the facts under oath, to the appropriate local representative of the various State councils of defense.

"This representative of the State council will investigate the necessity of the proposed construction and transmit recommendations to the State council for review.

"The State council will review the case, and, if it decides in favor of the construction, it will at once send its recommendation, with a full statement of all the facts, to the non-war construction sections of the Priorities Division of the War Industries Board. The non-war construction sections will grant or withhold the permit and so notify the State council of defense, and the individuals concerned.

"If the State Council decides against the proposed construction, it will notify the person concerned that his project has been disapproved.

"The War Industries Board will inform all persons applying directly to it that they must first take up their projects with the appropriate local representative of the State Council of Defense.

"The ability of the War Industries Board to enforce this whole plan rests upon the fact that it controls priorities and has also secured from the manufacturers of building materials a pledge not to supply materials for projects which are not authorized under the regulations of the War Industries Board."

No applications will be considered by the War Industries Board until it has been reviewed by the State Council. Final decision comes from the Board.

Certain construction can proceed without license. The government rulings in this respect are as follows:

"Structures, roads, or other construction projects falling within the following classifications are hereby approved, and no permits or licenses will be required therefor:

"(1) After having first been cleared

and approved by the War Industries Board, those undertaken directly by or under contract with the War Department or the Navy Department of the United States or the United States Shipping Board Emergency Fleet Corporation, the Bureau of Industrial Housing and Transportation of the United States Department of Labor, or the United States Housing Corporation.

"(2) Repairs of or extensions to existing buildings involving in the aggregate a cost not exceeding $2,500.

"(3) Roadways, buildings and other structures undertaken by or under contract with the United States Railroad Administration or a railroad operated by such administration.

"(4) Those directly connected with mines producing coal, metals and ferro-alloy minerals; and

"(5) Public highway improvements and street pavements when expressly approved in writing by the United States Highways Council.

"No building project not falling within one of the foregoing classes shall be undertaken without a permit in writing issued by or under the authority of the chief of the non-war construction section of the Priorities Division of the War Industries Board."

Construction already under way will be allowed completion.

The Government, through the War Industries Board, intends to keep a close check upon the building situation in all parts of the country. In order to simplify and facilitate this work building material dealers are required to report monthly a statement of their commodity sales, with the location to which materials were delivered, the amounts involved in each order, name of consignee and the purpose for which the materials were to be used. The reports for each kind of material, brick, lime, cement, etc., are to be made direct to the association controlling the manufacture of said commodity. These central bodies will in turn report in a monthly statement direct to the War Industries Board. If it is discovered that material dealers are not living up to the intent of the recent ruling regarding the sale and delivery of materials to non-war building operations priorities for the delivery of materials from manufacturers will be revoked. There is no penalty attached, the dealers being placed strictly on their honor as patriotic citizens and industries to support the Government while the emergency shall last.

These restrictions, it will be noted, do not apply to remodeling or repair work costing under $2,500 nor to work regarded as being of an essential nature. Undoubtedly farm buildings will be regarded as essential.

There is no cause for an ultra pessimistic stand to be taken. Repair work can be made to provide an outlet for the energies of the smaller man, while the bigger contractor will have the opportunity to engage in essential war construction. At present the building programme of the construction division of the War Department involves 476 distinct operations with an estimated cost of $1,083,766,198.

Production of Portland cement, glass, brick, hollow tile, etc., has been curtailed in the past, but there seems to be every reason to expect that lumber will be allowed freedom of marketing. The reason is that the government demand for lumber is enormous, but only part of this product is sawed into sizes that the government can use. The rest is waste, certain to swell manufacturing costs unless allowed to proceed into buildings. The material is ready; it is economical to use it; therefore its use is likely.

Paper Conservation Urged by Government

All publishers have been requested to conserve paper. If the request is not adequately observed, then there is grave chances of a paper shortage which will result in enforced curtailment or even suspension of supplies in some cases.

Paper conservation is essential to the winning of the war, more so than is generally realized. Its manufacture requires fuel urgently needed for other purposes; it contains valuable chemicals necessary for war purposes, especially in the making of ammunition or poisonous gas; labor, capital and transportation space used are required for other purposes.

Every publisher will undoubtedly heed the government's request. Stringent regulations have already been made curtailing complimentary copies, sample copies, size of paper, etc.

All restrictions will be cheerfully complied with by BUILDING AGE. Any curtailment will, however, not result in a smaller amount of material being presented to our readers. Condensation of all articles will result in just as great a variety of information, but it will be presented in even more compact form than at present.

Friendship Is a Big Asset

The practicing of friendship, either in business or in one's daily life, is the biggest and best way to make the world give us a better deal. The friendly man is constantly building himself a lovable personality and a circle of friends that constitute the best asset any man can have.

A man I know has constantly tried to build himself a personality by punctiliously passing favors on. If he has been given a lift along a country road, the next time he is out in a rig he tries to find someone whom the favor can be passed along to. If a man gives him directions in a strange town, he tries to be doubly courteous to the stranger who asks him where such and such a street is, remembering the helpful way in which he had been assisted. This trying to repay a favor by passing it along, keeping a mental account to balance, has often helped him when a hurried reply has been the natural thing. No man likes to be a sponge, to take all and give nothing. This friend of mine always tries to pay for his favors, some time, somewhere—and he has always found that it pays well.

People constantly in touch with others often seem to take special pains to help another whenever they can. In fact, a man's likeableness is in direct proportion to his friendliness.

We naturally like those who like us. So the best way to acquire friends is to be a friend, to try hard to like those with whom we come in contact.

Friendship in the building business is a big asset. The man who gives you a contract is a possible big booster—if he likes you as well as your work. The building inspector will often show you a way out of a difficulty—if you are a friend of his. The architect or superintendent who supervised your last job can often swing a contract to you or show a leniency that will turn a loss into a profit —if you are a friend of his.

So it goes; that man is a success who makes himself a friend, who is sincerely interested in those about him and who is anxious to do a good turn whenever possible. Be a friend; it pays.

Building Activity Throughout the United States

The opinion is freely expressed that construction has already reached its low level and that the new government restrictions will have but little effect on the total output of the trade. Buildings for several months past have in the great majority of cases been strictly intended for the quicker winning of the war. Factories, housing projects, etc., have all been planned to help the Allied forces roll back the Hun wave.

Private work has tended more and more toward repairs and remodeling. This will be quickened under the stimulus of "No license required for repairs or remodeling where the cost is under $2,500."

Meanwhile, the shortage of all sorts of peacetime structures is becoming increasingly acute. When the war clouds blow past, and peace is more in the air than it has been since the great war broke out, there is undoubtedly going to be a rush of work that will keep material factories going at their utmost

capacity. Every indication points toward this. Consequently, many builders and architects are to-day keeping themselves up to the mark and ready for the rush when it comes. Any present sacrifice is regarded well worth while for the return that it will bring in the future.

Architects frankly express their expected inability to take care of all the after the war work. Much of this will from very necessity have to be refused. Therefore the client who plans his structures now is taking the advantage of conditions that the far seeing always do.

For the month of August, 1918, compared with August, 1916, a decrease of only 8 per cent is shown by the figures gathered by BUILDING AGE, 146 cities reporting. Indeed, the East, which has been a steady looser, shows a very slight gain. The West also shows a gain, 21 per cent. The middle and southern sections of the country both show losses, respectively 23 and 9 per cent.

Of course much of any apparent gain is due in part to increased cost of construction. There seems to be little hope, however, for costs ever to be what they were before the war.

The detailed report is as follows:

CITIES IN EASTERN STATES

	August 1918				August 1917			
	New Work		Repairs		New Work		Repairs	
	Permits	Value	Permits	Value	Permits	Value	Permits	Value
Chelsea, Mass	16	69,800	...	....	11	18,825	...	....
Albany, N. Y	136	43,697	...	....	155	220,650	...	....
Allentown, Pa	12	37,100	...	....	22	38 455	...	....
Altoona, Pa	48	13.457	...	....	32	14 685	...	....
Atlantic City, N. J	25	12,340	24	12 340	4	18,895	46	107,096
Auburn, N. Y	5	28,900	...	....	14	16,100	...	....
Bayonne, N. J	15	85,448	...	....	20	57,873	...	....
Binghamton, N. Y	37	25,979	63	23,855	74	57,836	124	41,779
Boston, Mass	43	307,805	336	452,962	85	1,038,410	307	257,719
Brockton, Mass	15	16,545	11	27,960	23	37,820	20	12,550
Buffalo, N. Y	387	777,600	68	96,400	...	....	...	....
Camden, N. J	53	2,734,634	...	....	43	122,983	...	....
East Orange. N. J	29	56.798	...	....	42	43,184	...	....
Erie Pa	92	348,954	...	....	133	265,785	...	....
Harrisburg, Pa	16	17,075	...	....	35	188,740	...	....
Hoboken, N. J	3	2,400	8	2,850	4	14,800	6	9.150
Holyoke, Mass	7	25,600	2	250	7	8,935	9	3.500
Lawrence, Mass	19	38,770	21	75,950	6	62,350	9	7,850
Manchester, N. H	52	27,195	...	....	60	43,195	...	....
Mount Vernon, N. Y.	10	11 620	12	15,725	16	61,825	7	3,715
Newark. N. J	164	357,240	...	....	195	566,618	...	....
New Bedford. Mass	37	113,825	...	....	43	691,787	...	....
New Britain Conn	26	109,105	34	13,230	31	118,060	15	8,770
New Haven Conn.	91	180,420	...	....	99	578,284	...	....
New York	1802	5,095,595	...	....	1165	5,285,326	...	....
Manhattan	16	424,000	226	1,129,437	23	1,065,600	288	975,696
Bronx	11	73,050	125	427,187	141	789,375	157	58,860
Brooklyn	182	1,521.035	627	468,747	86	1,302,000	738	565.961
Queens	438	893,660	...	....	205	919,640	...	....
Richmond	58	160,479	...	....	87	623,345	...	....
Niagara Falls, N. Y	52	231,579	...	....	60	253,681	...	....
Passaic, N. J	10	113,150	17	10,400	15	84,500	6	3.300
Paterson, N. J	89	123,373	...	....	104	152,640	...	....
Philadelphia, Pa	516	1,931,390	...	....	666	1,554,115	...	....
Pittsburgh, Pa	150	743,963	99	166,320	159	548,436	117	159,184
Portland, Me	12	5,708	11	27,885	13	34,000	22	20,810
Quincy, Mass	76	93,133	...	....	58	100,500	...	....
Reading, Pa	27	33,300	111	16,450	32	37,975	96	25 600
Rochester. N. Y	70	222.040	82	88,056	110	183,868	85	200,773
Schenectady, N. Y	29	69,965	20	17,831	34	42.680	36	6,069
Scranton, Pa	9	9.925	...	....	20	54,233	...	....
Springfield, Mass	65	99,035	...	....	87	144,835	...	....
Syracuse. N. Y	139	374,389	...	....	142	338,270	...	....
Trenton, N. J	36	63.555	...	....	49	321,990	...	....
Fitchburg Mass	18	22,450	...	....	23	12,497	...	....
Troy, N. Y	28	20,030	...	....	34	13,378	...	....
Utica, N. Y	19	72,275	9	17,465	11	52,900	6	25.750
Wilkes-Barre, Pa	42	217,298.	...	....	66	79,908	...	....
Worcester, Mass	121	400,530	...	....	129	591,580	...	....
York, Pa	25	7,655	...	....	41	7,223	...	....
Lancaster, Pa	13	64,550	...	....	19	33,519	...	....
Malden, Mass	31	8,020	...	....	11	18,350	...	....
Somerville, Mass	17	17,450	...	....	23	198,750	...	....
W. Hoboken, N. J	7	9,800	...	....	5	3,500	...	....
Yonkers, N. Y	22	108,000	...	....	39	74,800	...	....
	5468	$18,672,689	1906	$3.091,300	4811	$19,209.509	2098	$2,494,132

CITIES IN EXTREME WESTERN STATES

	August 1918				August 1917			
	New Work		Repairs		New Work		Repairs	
	Permits	Value	Permits	Value	Permits	Value	Permits	Value
Berkeley, Cal	11	27,700	49	10,545	25	97,000	85	37,000
Denver, Col	115	183,300	75	40,000	103	446,350	91	72,000
Los Angeles, Cal	341	600,266	228	163,313	231	700,909	256	190,576
Oakland, Cal	194	871,756	82	29.721	164	351,868	107	36,292
Pasadena. Cal	12	17,579	37	16,951	36	82.352	62	21,705
Portland, Ore	329	350,348	256	116.310	139	250.420	156	82,680
Pueblo, Col	39	27,069	...	....	31	19,530	...	....
Salt Lake City, Utah.	53	203,300	...	....	68	101,850	...	....
San Diego, Cal	53	498,055	65	24,405	42	54,600	72	59,410
San Francisco, Cal	61	663.262	263	205,266	69	998.475	367	219,216
San Jose, Cal	18	10,200	...	....	25	21,385	...	....
Seattle, Wash	1331	1,099,015	...	....	664	464,765	...	....
Spokane, Wash	40	17,497	17	51,174	41	173,970	39	26,280
Stockton, Cal	69	76,098	...	....	33	54,485	...	....
Tacoma, Wash	285	244,555	120	40,975	40	27,935	41	11,945
Fresno, Cal	32	56,001	48	59,605	29	125,345	52	43,236
Long Beach, Cal	223	243,599	...	....	81	110,725	...	....
Eureka, Cal	3	2,300	3	1,800	2	13,000	6	4,000
	3209	$5,191,900	1243	$760,065	1823	$4,094,964	1334	$804,340

CITIES IN MIDDLE STATES

	August 1918				August 1917			
	New Work		Repairs		New Work		Repairs	
	Permits	Value	Permits	Value	Permits	Value	Permits	Value
Akron Ohio	147	$241,475	57	$43,450	346	$818,172	81	$42,745
Canton Ohio	76	145,655	...	....	54	110,310	...	....
Cedar Rapids Iowa	12	59,000	10	13,000	20	176.000	14	19,000
Chicago Ill	247	4,635,900	710	237,746	374	4,272,650	...	....
Cincinnati Ohio	77	93,860	95	16,575	134	537,515	76	19,175
Cleveland Ohio	182	2,063,300	653	237.600	84	4,358,850	1048	220,365
Columbus Ohio	66	247.450	59	57,575	83	246.715	47	37,010
Davenport Iowa	125	209,178	...	....	72	101,789	...	....
Dayton Ohio	128	419,758	...	....	77	131,020	...	....
Des Moines Iowa	31	574,529	...	....	50	110,850	...	....
Duluth Minn	48	64.550	69	114,910	80	414,451	99	56,114
East St. Louis Ill	20	63,585	...	....	49	157,109	...	....
Grand Rapids Mich.	98	192,535	...	....	97	141,299	...	....
Indianapolis Ind	431	931.394	...	....	439	834,330	...	....
Joplin Mo	21	32,975	5	4,000	53	641,230	5	3.850
Kansas City Kan	7	18,250	8	8,500	16	33,550	8	63,205
Kansas City Mo	24	202,250	134	75,700	71	484,950	194	118,390
Lincoln Nebr	17	26,650	...	....	40	89 580	...	....
Milwaukee Wis	231	468,813	...	....	312	1,034,224	...	....
Decatur Ill	20	52,725	...	....	35	97,150	...	....
Minneapolis Minn	284	319,815	...	....	489	745,425	...	....
Omaha Neb	88	311,440	...	....	92	775,6[illegible]5	...	....
Peoria, Ill	29	68,030	...	....	27	112,080	...	....
Saginaw, Mich	63	108.553	...	....	25	56.698	...	....
St. Louis, Ill	157	408,650	268	263,250	243	433,923	385	366,988
St. Paul, Minn	205	344,618	...	....	264	552,987	...	....
South Bend, Ind	104	45,055	...	....	142	218,223	...	....
Springfield, Ill	8	14,100	25	14,225	19	27,755	21	27,325
Superior, Wis	88	336,415	...	....	100	112,870	...	....
Terre Haute, Ind	40	33,255	23	8,740	13	15.015	18	9,520
Toledo, Ohio	161	298,148	...	....	297	375,534	...	....
Topeka, Kan	21	14,976	...	....	36	49,318	...	....
Wichita, Kan	114	194.120	...	....	52	80,655	...	....
Youngstown Ohio	129	319.020	19	13,922	111	480,780	21	31.325
Hamilton, Ohio	22	95,265	...	....	18	9,957	...	....
Jackson, Mich	45	51,687	...	....	41	66,315	...	....
Lansing, Mich.	40	18,235	...	....	10	4,950	...	....
St. Louis, Mo	421	671,900	...	....	614	800,911	...	....
	4029	$14,707.114	2147	$1,117,773	5079	$19,692 765	2017	$1,015,012

CITIES IN SOUTHERN STATES

	August 1918				August 1917			
	New Work		Repairs		New Work		Repairs	
	Permits	Value	Permits	Value	Permits	Value	Permits	Value
Augusta, Ga	113	32,981	...	....	104	36,955	...	....
Atlanta, Ga	61	103.963	104	62,543	106	588,301	101	100,353
Baltimore, Md	121	439,238	249	113,500	80	458,345	583	186,125
Beaumont, Tex	56	69,865	19	13,416	49	52,335	23	3,758
Birmingham Ala	232	74,599	...	....	386	112,255	...	....
Charlotte N. C	23	53,745	5	2.912	21	112.225	...	....
Chattanooga Tenn	132	24,295	...	....	163	62,525	...	....
Dallas Tex	30	189,900	19	58,830	25	116,350	30	28,809
El Paso, Tex	67	39.145	...	....	119	362,867	...	....
Jacksonville, Fla	34	165,875	...	....	40	209,166	...	....
Houston, Tex	221	278,496	...	....	165	297,847	...	....
Huntington, W. Va	32	34,130	...	....	35	27,855	...	....
Louisville, Ky	45	108,150	41	31,210	15	49,530	52	15,560
Memphis, Tenn	55	107,440	...	....	117	244.335	...	....
Miami, Fla	55	133,700	...	....	70	159,320	...	....
Montgomery, Ala	99	10,959	...	....	88	8,964	...	....
Nashville, Tenn	368	75,736	...	....	319	40,885	...	....
New Orleans La	36	134,990	26	70,484	54	182,486	9	49,695
Norfolk, Va	52	256,975	...	....	31	45,566	...	....
Oklahoma City, Okla.	56	109,290	...	....	63	171.150	...	....
Richmond, Va	26	94,488	74	90,734	31	48,655	44	62,969
San Antonio, Texas	215	216,720	...	....	137	178,300	...	....
Savannah, Ga	20	29,950	...	....	23	43.900	...	....
Corpus Christi, Tex	7	6,780	...	....	3	9,645	...	....
Covington, Ky	9	14,050	...	....	43	12,535	...	....
Tampa, Fla	85	21,500	...	....	54	26,125	...	....
Washington, D. C	118	600,820	304	350,750	162	883,080	119	155,400
Wilmington. Del	255	763,500	61	129 054	51	122,380	93	416,924
Fort Worth, Tex	83	206,480	...	....	25	35,845	...	....
Galveston, Tex	375	16,036	...	....	129	10,595	...	....
Knoxville, Tenn	64	24,865	...	....	149	126,161	...	....
Lexington, Ky	39	48,330	...	....	17	5,860	...	....
Portsmouth, Va	23	35,584	...	....	17	25.935	...	....
Roanoke Va	22	20,230	...	....	34	165,665	...	....
Wheeling, W. Va	18	31,175	...	....	56	24,915	...	....
	3247	$4.573.980	902	$923,433	2981	$5,058.858	1054	$1,019,593

A Beautiful Home That Is Typically Colonial

The house is reminiscent of the old farmhouse type.

In designing a building, particularly a dwelling, the architect usually has in mind some vision of what the completed structure will be, surrounded with shrubbery and vines, and furnished in accordance with the style of the architectural design. How often, to his sorrow, does he find these creations of his brain furnished and adorned in a manner anything but in harmony with his ideas. In the case of the house under discussion, however, the architect and the owner worked together in the fullest harmony and co-operation. No detail was overlooked that could contribute to the simple and delightful unity of design apparent in this home.

Glancing at the exterior views, some of these points become apparent at once. First of all, notice the solid batten shutters at the first floor windows, while those on the second floor are of the open, slatted type. This is indeed reminiscent of Colonial days, when Indians and other terrors were securely barred out by the solid ground floor shutters, while those on the upper floors were of the open type to facilitate ventilation. The wide clap-

A corner in the dining room, looking toward the living room and pantry. Note the built-in china closet.

The living room, looking toward the French windows at the rear of the house

boards are also characteristic of this style, as is the severity of moulding and trim, within and without. Another interesting point to which attention might be called at this time is the fact that the meeting rail of the first floor windows is at considerably more than center height. This is a matter of great comfort and convenience to the inhabitants of the house, since they can stand looking out of the window without having their view obstructed by the usually obstructing meeting rail.


One of the bedrooms

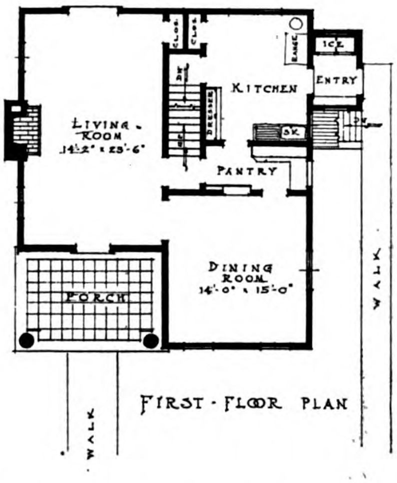

The rear of the house is decidedly interesting. The lattice work relieves the plainness and helps to balance the two-size windows in the first story.

The stucco columns in the large entrance porch lend a more modern note to the design, giving also a delightfully contradictory air to the old fashioned door hardware, apparent in the colored supplement.

The rear view of the house shows many interesting features, in particular the unusual trellis treatment of a wall which might otherwise appear rather too blank. Notice how this treatment softens the outlines of the window openings, while disguising the great difference in size of the two pairs of windows. Without this trellis, a lack of balance due to this difference in size would undoubtedly have been apparent, but with this excellent treatment what might have been a weak point becomes one of those quaint and delightful vagaries of Colonial design. The French windows, it will be observed, lead from the living room to a wide cement terrace at ground level. The second story windows at the rear are casement sash, opening out. All other second story windows are double hung.

The interior of the house is, if possible, more delightful than the exterior. The architectural design is reinforced with cheerful cretonnes, soft-toned walls and appropriate furniture, while tht planning leaves nothing to be desired. Everything is provided for amply, but in a most economical and unostentatious


The living room, looking toward the front door. At the left is the stairway and the dining room.



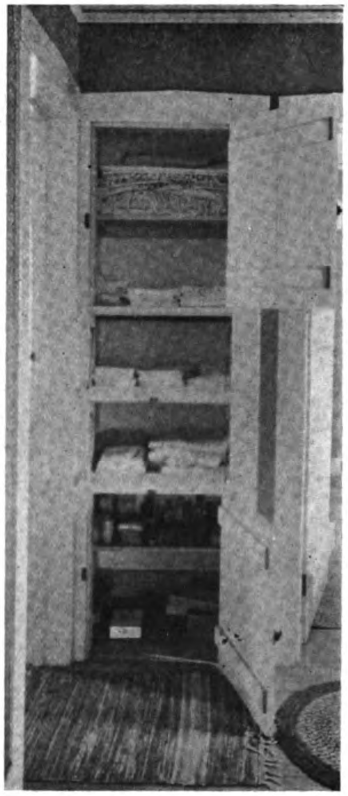
FIRST-FLOOR PLAN

fashion. The rooms are large and airy, and the arrangement is unusually good.

There are some points of particular merit in the first floor plan, the most important being the provision which has been made for the stairway. Stairways in small houses are often treated very casually, and often very badly. In some houses the stairs seem to rise from the threshold of the front door, so prominently are they placed in the entrance hall; in other houses the crowning feature of the living room would appear to be the none too sightly staircase which looms up, large and imposing, blotting out the importance of every other function of the room in which it is placed. Notice that access to this stairway is had through a doorway, which is curtained, giving a degree of privacy without the air of being shut off, which would come from the use of a door. One can reach this stairway readily from the kitchen also, while the passageway from pantry to living room makes it possible to reach the front door without going through the dining room, another consideration of importance in the small house.

Glancing at the plan, notice the admirable arrangement of the pantry doors. One does not have to turn at a sharp angle in going from kitchen to dining room, but the doors are placed sufficiently off centers so that one seated in the dining room does not catch glimpses through the swinging doors of culinary matters in process. One can also see from the plan the peculiar construction of the built-in china cupboard in the dining room, which is shown in one of the photographs. These are 6-in. walls, so in order to provide sufficient depth it was necessary to project the back of the cupboard about 4 in. beyond the face of the wall, on the pantry side.

A great deal of storage space is insured by the number of built-in dressers provided in kitchen and pantry. There is also a small closet off the kitchen, to be used for brooms and the like. A similar closet opens into the living room, the two of them serving to fill the unoccupied space back of the stairs to the basement. There are outside steps to the basement also, reached from a bulkhead which is apparent on the first floor plan.

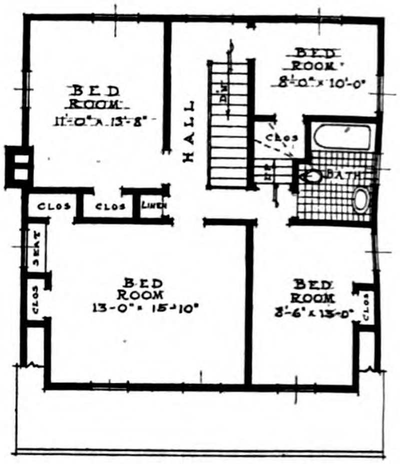


A closet on the second floor is decidedly out of theo rdinary. The top and the bottom are provided with doors; the middle sections have hinged fronts that drop down

A corner of the dining room.

On the second floor a most economical disposition has been made of the rooms. It is unusual to find four bedrooms in a house of this size, though it is true that none of these rooms is very large. Each is ample for its purpose, however, and each, it will be noticed, has windows on two sides. There is adequate closet space provided for each room, and the bathroom is plenty large enough also. Closet room for the small bedroom just at the head of the stairs is found under the stairs leading to the attic.

A photograph of the linen closet shows the unique way in which it is made. Two shelves at top and bottom are enclosed



SECOND-FLOOR-PLAN

by simple hand-made doors, while the doors of the two middle shelves are hinged to drop down. They are held in a horizontal position by small chains, thus making a sort of extension shelf which is very convenient in sorting and placing the linen to be contained in the closet.

All the woodwork in this house is distinctive, it will be noticed; it is characteristic of the simpler Colonial days, and it has the added interest of having been made by hand and at considerably less cost than mill work would have been. Notice the doors shown in the photographs of living room and dining room; they are as truly Colonial in their way as anything actually handed down from pre-Revolutionary days. The door hardware is equally interesting, for the same reason. It is all hand wrought, in the manner of Colonial hardware, and when applied to these simple, sturdy, handmade doors gives an effect not common in the American small house.

This is a practice which has much to recommend it. Not only is it economical and in keeping with the general scheme, but it helps to get away from the monotonous machine-made character that most smaller houses have. It also goes to show the excellent results that can be accomplished when brains and ingenuity are combined in the planning of a house.

The completed cost of $5,000, two years ago, included all grading, the cement sidewalks and the fence at the rear, the wall painting, window shades, gas range in kitchen and many other smaller details. The house is heated with a warm air furnace and is electric lighted. It was built for Mrs. G. H. Hillman at Plainfield, N. J., from the plans of Robert Sherlock, architect, New York City.

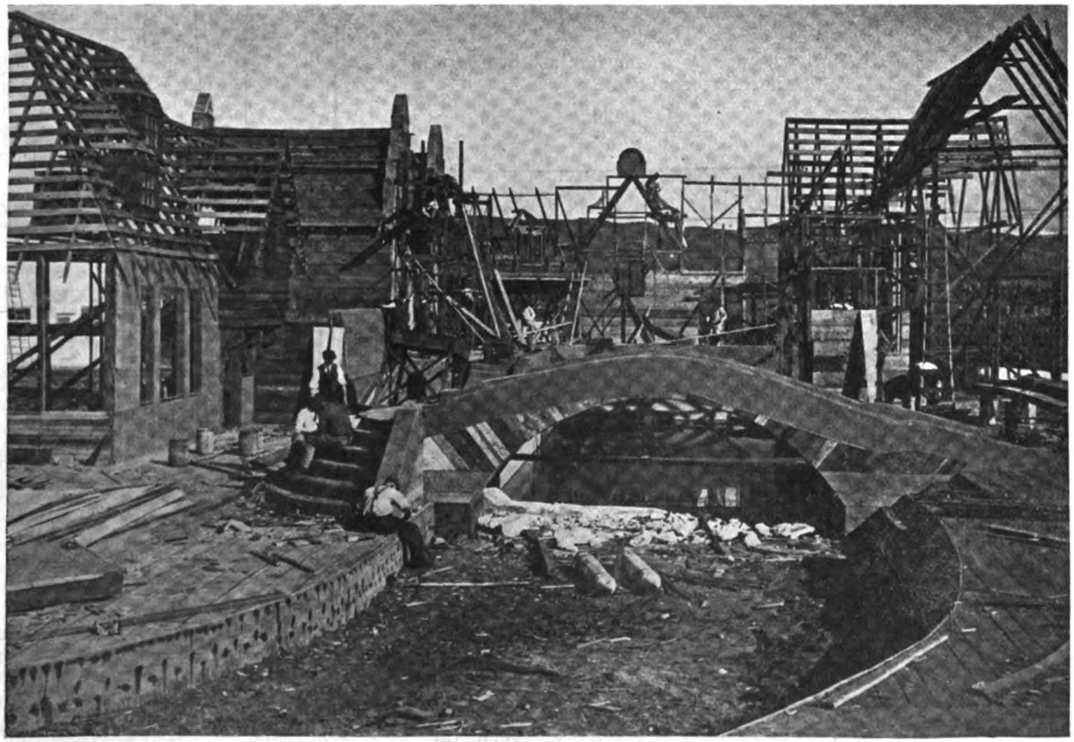
Correction in Architect's Name

The two-family house published on page 439 of the September issue should have been credited to George S. Welsh and Lewis E. Welsh, architects, Wilkes-Barre, Pa.

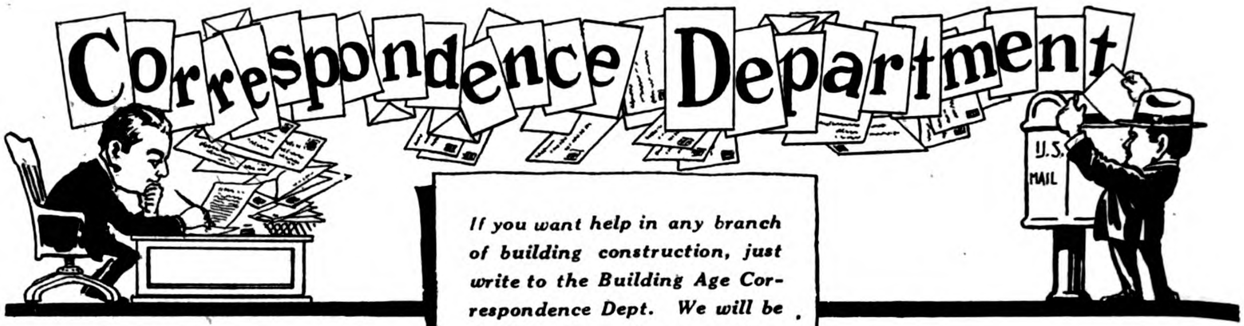
A DUTCH VILLAGE FOR THE MOVIES

IT is a well known fact that large sums are often expended and extensive building operations conducted in preparing some of the scenes presented in connection with important film pictures which are displayed so numerously throughout the country. In some instances an entire city is constructed simply as a setting for a single play and even for a single scene in that play. A striking instance of this kind is pictured herewith, representing a Dutch village erected at Culver City, California, and requiring in its construction 120,000 ft. of Oregon pine, 25,000 ft. of California redwood, 1000 sq. yd. of tile roofing, 10,000 bricks and 18,000 sq. yd. of water proof plastering for the plastered sides of the canal clearly shown in the foreground of one of the pictures shown on another page.

Of the two pictures of the village presented herewith, one shows the construction work in progress and the other a scene in a part of the village near the canal. Work of this character is an indication of the outlet for building materials which the modern moving picture producing plant offers to manufacturers who will go after it.



The Movie Village Under Course of Construction



If you want help in any branch of building construction, just write to the Building Age Correspondence Dept. We will be glad to answer all your questions without charge.

Questions should be confined to construction only, as the editors cannot undertake to design structures.

All readers are invited to discuss the questions and answers published.

Concrete Walls for Shallow Reservoirs

From F. H. R., Oklahoma.—Could you help me out in getting information on shallow reservoirs, say 200 ft. x 150 ft. x 4 ft. high, walls of concrete? You have already helped us in getting data on concrete work and we are everlastingly obliged to you. We are using vast quantities of cement.

Answer—In answering this letter we will consider two typical cases:

Case I.—Assuming that the 4 ft. height is above the average level of the existing ground surface, and that it is necessary to carry the foundations down a depth of 4 ft. to get below the frost line, the solution would be as shown in Fig. 1.

The only force acting on the wall tending to overturn the wall or to slide it along on its base is the pressure P due to the horizontal pressure of the water. This pressure of the water on a unit section of the wall is equal to the area of the section multiplied by half the length of the water, and this product multiplied by the weight of a cubic unit of water. In our case

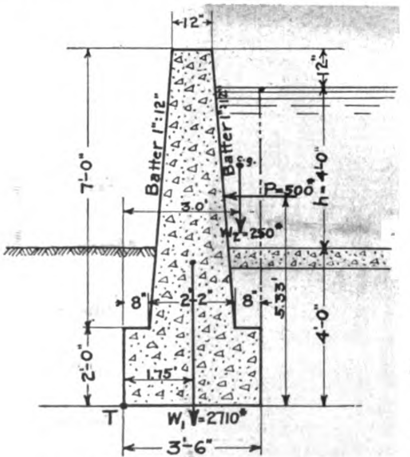


Fig. 1—Method of constructing a shallow reservoir above ground.

$$P = h \times \frac{h}{2} \times 62.5$$

$$= 4 \times 2 \times 62.5$$

$$= 500 \text{ lb. per lin. ft. of wall.}$$

The line of action of P is 2/3 h below the surface of the water, or a distance of 5.33 ft. above the base of the wall.

The overturning moment about the toe T (Fig. I.) is equal to

$$-M_T = 55 \times 5.33 = 2665 \text{ ft.-lb.}$$

This overturning moment is resisted by the weight of the wall W1, and the weight of water W2, resting on the inner face of the wall. The weight of the wall is equal to 2710 lb. and the weight of the water is equal to 250 lb. Taking moments of these weights about the outer toe T, we have the resisting moment

$$+ M_T = 2710 \times 1.75 + 250 \times 3.0 = 5490 \text{ ft.-lb.}$$

The safety factor against overturning is therefore equal to

$$\frac{+M}{-M} = \frac{5490}{2665} = 2.06,$$

which is considered safe.

The force tending to slide the wall along on its base is the horizontal pressure of the water, which we have found to be equal to 500 lb.

The force resisting this tendency to slide is the friction along the base of the wall. Taking the coefficient of friction of the concrete on earth as 0.05 we have the resisting force equal to 0.5 (2710 + 250) = 1480 lb. Therefore the safety factor against sliding is 1480 ÷ 500 = 2.96, which is ample.

It should be noted that the minimum thickness at the top of 12 in. was used to take care of ice and wave. Should any considerable thickness of ice be apt to form in the reservoir the horizontal pressure due to the ice would have to be taken care of. Also that if the depth of the foundation can be decreased, due to the absence of frost in the locality, the base may have to be widened to counterbalance the reduction in weight of the wall.

Other simple forms of wall, such, for example, as a vertical front face and sloping rear face of wall, can readily be investigated in a similar manner.

Case II.—Assuming the reservoir to be in excavated material or that earth will be filled in around the reservoir to the top of the wall, the solution would be as shown in Fig. II.

With the reservoir full and the backfilling properly placed and tamped before the basin is filled, the abutting power of the earth and the weight of the wall as designed for the empty reservoir would more than counterbalance the water pressure.

With the basin empty the walls must be designed to resist the earth pressure. Investigating the wall as a retaining wall and neglecting the earth on the inside of the footing, which is on the side of safety, the total earth pressure against the wall is equal to

$P = 13.5 \times H^2$ (See BUILDING AGE, July, 1918, p. 349)

$$= 13.5 \times 9^2 = 1090 \text{ lb.}$$

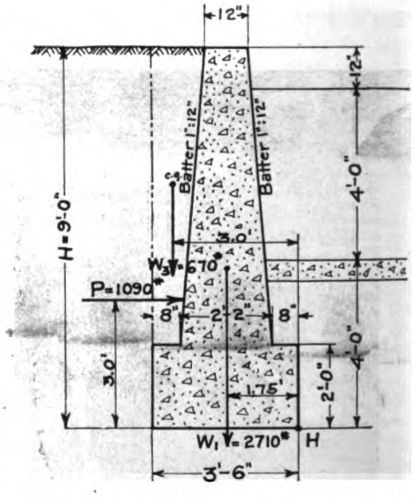


Fig. 2—Method of constructing a reservoir where it is to be in excavated material.

The overturning moment about the heel H is equal to

$$-19_H = P \times \frac{H}{3}$$

$$= 1090 \times 3$$

$$= 3270 \text{ ft.-lb.}$$

This overturning is resisted by the weight of the wall W1, which is equal to 2710 lb., and the weight of the earth W3, which is equal to 670 lb. Taking moments of these weights about the heel

H, we have the resisting moment equal to

$$+M_H = 2710 \times 1.75 + 670 \times 3.0$$
$$= 6750 \text{ ft.-lb.}$$

The safety factor against overturning is therefore equal to

$$\frac{+M}{-M} = \frac{6750}{3270} = 2.07, \text{ which is safe.}$$

The safety factor against sliding is equal to 0.5 × (2710 + 670) ÷ 1090 = 1.55. Any tendency to slide will be further resisted by reservoir floor so that the wall is safe against sliding.

The reservoir should be made impervious by coating with Portland cement mortar or by using an asphaltic coating.

L. Goodman, C.E.

Construction of Double Hung Gothic Window

From S. M. R., Pennsylvania.—We have some double hung gothic head church windows to make in our shop, and have no particular detail to go by. Some of my fellow workmen contend that the line of the meeting rail in sash of this design should not come in the center of the full height of the sash opening as in ordinary square head, two-light, double hung windows.

Some of them claim that the top glass should be higher than the bottom glass, or vice versa.

Will you kindly answer me through the columns of your journal whether the top glass should be the same height as the bottom glass or of different dimensions?

Answer—The position of the meeting rails of sash to Gothic head windows depends largely upon whether the frame is constructed with a square head or to the radius of the Gothic Arch.

We will first consider the position of meeting rails for sash used in conjunction with the square headed frames.

What I am going to say in regard to placing of the meeting rails need not be taken as the absolute rule, as examples differentiating from mine are in use, as are also those concurring with it. The meeting rails of sash to Gothic head windows of the square head, double hung type are generally constructed so that the rails will be slightly off center when the sash is hung, the upper sash being the largest.

The distance which the meeting rails are placed off center depends entirely upon the width and height of the window and the height from the spring line of arch to its top.

I know of no rule of architectural design governing the point in question, and I doubt if there is any. The method generally used to arrive at the proper position of placing meeting rails is to make a sketch of the opening and sash at ¾-in. scale; then sketch in meeting rails in various positions until a correct proportion is obtained, as determined by the eye, between the upper and lower sash.

What I have in mind when I mention proportion is that the proper position is arrived at when the meeting rails in a certain position make the upper and lower sash appear of equal heights.

Should the meeting rails be placed so that they would center on the full sash opening, the upper sash would appear to be of less height than the lower; this due to the Gothic glass shape and the apparent crowding of the sash between the hanging stiles from the spring line to the top.

I would suggest that you draw two sketches similar to that which you submitted, one with meeting rails centered and the other with meeting rails slightly lowered and off center. With these sketches before you you have a comparison which will illustrate exactly what I am endeavoring to explain.

Now that we have disposed of the position of the meeting rails for sash to square headed Gothic frames, we will consider the position of those to frames which follow the radius of the Gothic opening.

The position of meeting rails in this type are readily determined. They always center on the distance from sill to point of where the radius starts. It is obvious that this should be so, as the underside of the bottom rail of the lower sash when fully opened will be flush with the underside of the meeting rail of the upper sash.

Now if the meeting rails were centered the lower sash could be only opened a distance equal to a height from spring line to position of meeting rails, so that it is quite clear the correct position is as here before stated it should be.

W. G.

A Kink in Using Concrete

From N. J. P., Canada.—Your August, 1918, issue of BUILDING AGE carries an article by John Upton entitled "Some Kinks in Using Concrete," and in which instructions on chimney construction advise the use of wood cores, which are to be later burned out.

I tried this method some twenty years ago, and found the swelling of the wood cores always developed cracks in the concrete; also that the burning out of wood cores usually has to be done before the concrete is thoroughly hardened, thus driving off the moisture and preventing further material hardening.

I now always use cores of flue tile or old or new stove or furnace pipe, and never have a defective concrete flue.

Blue Prints and How They Are Made

From E. X. R., Conn.—I have been a subscriber to your valuable paper for the past few years and think very highly of it as a valuable source of information.

Will you please publish in your correspondence column the formula for making blueprint paper; also method of making and finishing the prints?

Answer—To prepare blueprint paper used in the making of copies of plans and other drawings dissolve 1 oz. avoir. of ammonia citrate of iron in 6 oz. of water. In a separate bottle dissolve the same quantity of potassium farricyanide in 6 oz. of water.

The solutions should be kept in their separate bottles until such time as they are to be used on the paper. Bottles in which solutions are kept should be of opaque glass and stored in a dark place to keep solutions from deteriorating.

To prepare paper mix equal proportions of the two solutions in a flat dish; with a soft sponge spread it evenly over the surface. It will be found that to start at the top of the paper and work from left to right and toward the bottom will give the paper a good coating evenly and economically distributed.

After the solution has been applied let the paper lay on a horizontal surface until the solution has had chance to set on its surface, which will take from 4 to 10 min. It should then be hung up to dry.

The preparation of paper must be done in a darkened room, as direct rays of light would affect the sensitized surface and lower its value. A room can be made sufficiently dark by pullingf down the shades.

After the paper has been prepared and dried it should be stored in a dark closet or a light tight drawer. As an additional precaution it would be of advantage to wrap it in heavy paper.

To make prints, place ink side of tracing down against the glass, then lay paper with the sensitized surface on tracing. On paper place felt and on it all the hinged back of printing frame. Expose to sunlight for from 3 to 10 min., which will be sufficient.

After the paper has been sufficiently exposed, wash in a pan or trough of cold water for about 10 min., after which the prints should be hung up to dry.

Prints after washing should be of a dark blue color with clear white lines. If they are pale blue it is an indication that the prints did not have sufficient exposure, and if the lines are not clear it indicates that they were over-exposed.

The transparency of the surface upon which the original drawings are made also have a direct bearing on the quality of the finished print; i.e., the more transparent the cloth or paper and the heavier the lines upon it the clearer will be the print.

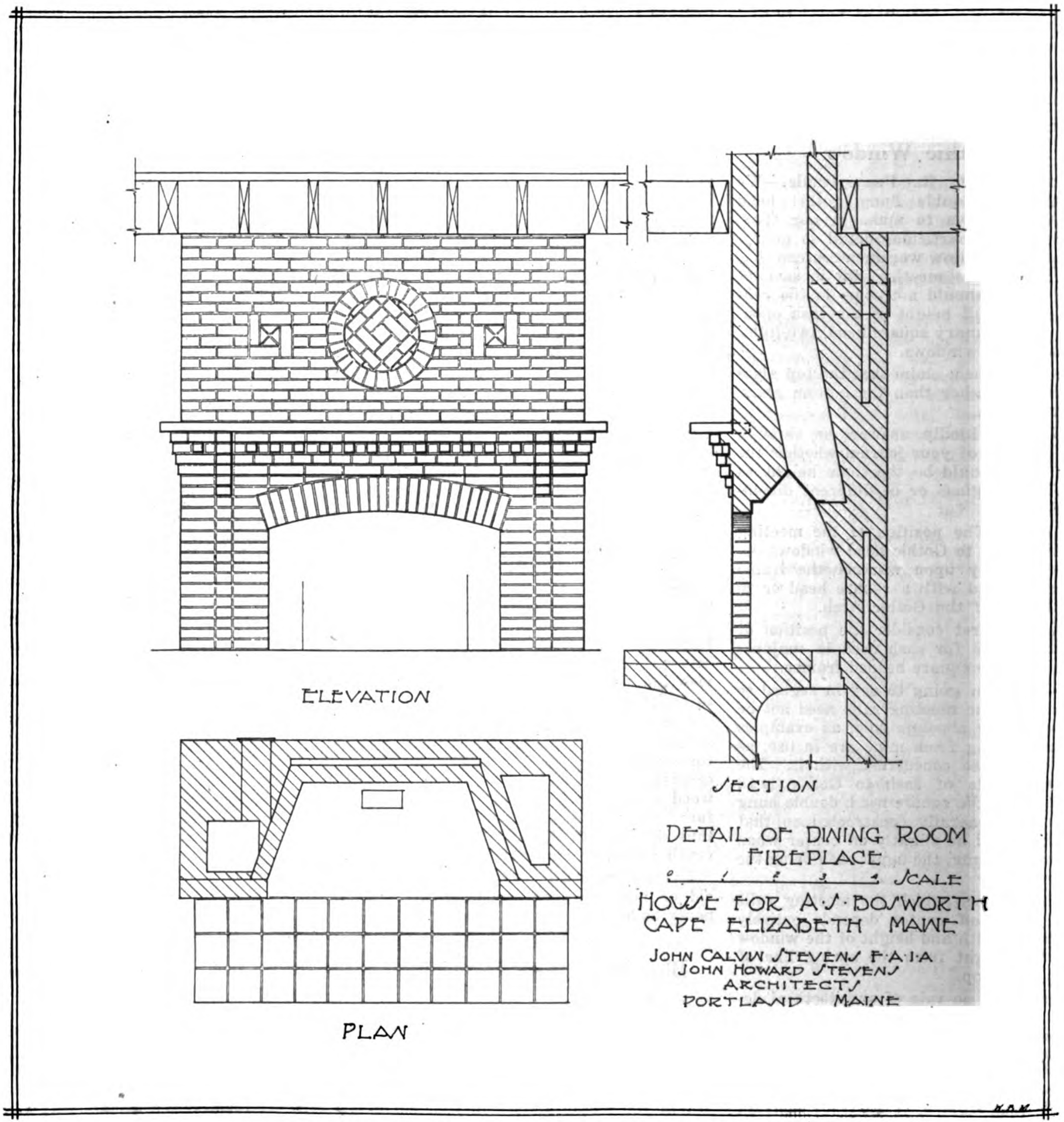
Some builders and owners object to blueprints as they do not show up ink corrections readily. This objection can be overcome by mixing ordinary washing soda with water, making a solution of it with which corrections can be made to the prints with either the ruling pen or ordinary writing pen.

In correcting prints, should it be desired to remove white lines, erase by going over them with a good quality blue lead pencil, one as near the color of the body of the print as possible.

To make corrections in red on prints simply mix with the washing soda carmine ink which, after being applied, will show to a clear red.

W. G.

Details of a Brick Fireplace



Conditions in the Lumber Trade

A Brief Review of the Past Month's Activities

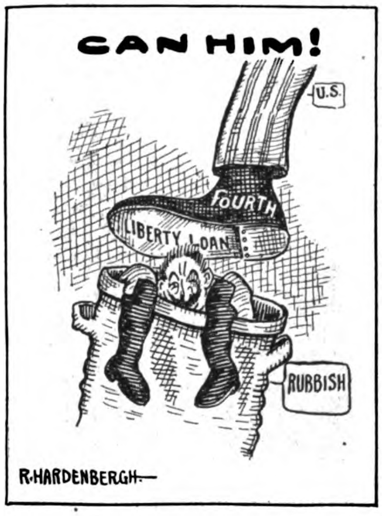
A better feeling as to the outlook for future lumber buying was noticeable throughout the country the past month, and while it is not expected the volume of business this fall and winter will compare with that of last year, due to the scarcity of labor, the high cost of materials and war conditions generally, a fairly good business is looked for, especially in the rural districts. Country dealers are showing a tendency to lay in stocks for the expected farmers' trade, and while the market continued very dull last month, a number of inquiries were received and prices remained steady, indicating that improved conditions are anticipated.

The lumber trade at present is just emerging from the usual mid-summer dullness.

There are two chief causes of worry to the lumberman "which are the cause of more than one gray hair." These are both directly traceable to war conditions. The difficulty of making shipments and the extreme shortage of labor are "bugaboos" which are troubling the dealer. The car shortage and congestion of the nation's railroads has always been a source of worry, but it is believed that this year the government, by experience, will have mastered the situation to some degree. The solution of the labor problem, however, is not an easy one. Just at present the shortage of cars is severe, but what the effect will be when the 18 to 45 draft is in motion only conjecture can be made. Much of the shipment trouble can also be laid to labor shortage. To illustrate, a New York lumber dealer received several cars of lumber and because the labor to unload was not obtainable and unloading proceeded slowly, this point was embargoed.

Of couse the bulk of lumber cut goes for direct or indirect government consumption and very little is diverted for commercial purposes. My next statement may be a bold one, but nevertheless a statement true to fact. Ninety-five per cent of the lumber cut in the United States at this time is used for government purposes. Government purposes include shipbuilding, cantonment construction, storage warehouse building and industrial housing plans.

Lumber manufacturers of the South and Pacific Coast have no time to worry over a dull market, for while the commercial demand is exceedingly light they have all they can do to fill government orders for shipbuilding timbers, railroad materials, lumber for building warehouses and cantonments and trench construction and aeroplane materials. Many millwork factories and other plants are also engaged in the actual construction of aeroplanes and in the making of furniture and equipment for the new ships which will form the American merchant marine. So great has been the government demand in those sections that mill stocks are badly broken and it is impossible to secure many items for the commercial trade. Large timbers, for instance, are not to be had except for government work.



There are increasing evidences from many sections of the country of something in the nature of an impending farm building movement along the lines of general improvement which, in some instances, assumes the proportions of new and more commodious homes. The movement has been stimulated in the Central West, southern and southwestern sections of the country by heavy rains during the last week or ten days which have put everybody in a good and generous humor, and there is no disputing the fact that the producers of the country's requirement—war and otherwise—have the money with which to build if they will only build. The Government's open encouragement of general farm improvements has also had a generally stimulating effect. This bodes only good for the next few months' business in the lumber industry.

Summing up, the lumber trade of the country is fully organized to take advantage of every opening in the market. It is fully cognizant of every factor which has any bearing on the market and is able to take every advantage. The lumber dealer is literally "on his toes" in preparation for the fall season.

German Price-Fixing

Germany has had and is still having her troubles with price fixing in various industries. For instance, the only present legal market for barley in Germany is the Government, to which the farmer must sell at a fixed price of about 4 cents per pound. Short of physical compulsion, however, there is nothing to prevent the German farmer from feeding his barley, strictly on the quiet, to his hogs. And he does so, for the price of hogs is not fixed, and by the time barley is changed into pork the price per pound received for the barley is nearly doubled

Somehow, we seem to recall that things of this kind have happened in this country.

As a remedy the German Government developed a vast organization for the physical taking over of crops and requiring that barley be delivered at certain central warehouses at the price stated.

A recent speaker in the Reichstag rather aptly discussed this situation as

follows:

"The first stage," he said, "was for the State to declare that it would take over all crops. The second stage was the setting up of a Committee of Control. The third stage was the appointment by the committee of a vast army of officials. The fourth and final stage was the disappearance from the market of the commodity in question."

All of which we respectfully commend to those who believe that price fixing by the Government is a panacea for any and all industrial and agricultural ills.—*Wood Construction.*

War Lumbering in France

By Lieut. R. H. Faulkner

The larger and earlier fortunes made by lumbermen in America were due more to the acquirement of vast areas of stumpage at a price so ridiculously low that conservation was a thing to be scoffed at, while to-day the ever-increasing price of stumpage makes necessary the most careful and conservative management.

Could any operator to-day in the United States of America make a tour of the lumbering operations of the forestry regiments (10th and 20th Engineers), in France, they would see economical operations carried out to the minutest detail. And this is not fanatical conservation—it is not conservation that adds excessively to the cost of production, but it is due to an entirely new spirit of lumbering, the spirit of the American forestry troops, which taboos absolutely the waste of any material which can be of use. And when this is said, in France, it means the utilization of every part of the tree, down to branches only one and one-half inches in diameter.

Foresters Divide into Districts

The American forestry troops are divided into ten districts scattered practically through all timber areas of France, and this, by the way, is approximately one-tenth of the total area of the country. These ten districts are divided into about forty operations, ranging in size from a small pole, piling and tie cuttings to the operations of 20,000 capacity mills, running night and day shifts.

Many Different Species of Wood

There is a great variety in the species of timber over here, with the consequent variety in operating conditions. There is everything from a spruce forest, with logging conditions quite similar to those in the Adirondack mountains—to the maritime forests, almost identical to the pine found in southern Georgia.

The maritime pine forests in France cover approximately 2,500,000 acres and contain about 130,000,000 trees. The stand varies from approximately 6000 to 15,000 ft., board measure, per acre. While there are some very large blocks of solid timber, it is against the custom of the country to allow the cutting of great single areas, particularly for the reason that the peasantry in the maritime pine section are practically dependent upon the resin industry. Consequently, while there is quite a bit of timber available for the American exploitation, it is meted out, as a general rule, in small parcels, necessitating the installation of portable ground mills. However, some of the larger mills have as much as a one-year cut.

The American forestry troops in the pine country here are cutting, besides lumber, a great quantity of round timbers, ties, trench props and wire entanglement stakes. There is absolutely no waste, for all slabs and limbs are cut into fuel wood.

WHO PAYS YOUR SALARY?

Sounds like a simple question, doesn't it? And immediately you answer—the firm.

You're right, yet you're wrong. It is true that the money you receive each week in the little manila envelope is furnished by the concern which employs you. But—the one who pays you your salary—the one who really says how much shall appear to your credit every seven days is Yourself—You & Co.

By your interest in your work, your efforts for the interests of the firm, and your honest, productive sixty-minutes-to-the-hour service, the salary you are paid is measured. You pay your own salary. How much are you going to make yourself worth?—*Store Topics.*

There was a popular idea expressed by lumbermen in America before the departure of the first forestry battalions that the cost to the Government to produce lumber with the engineer troops in France would be tremendous. Several wiseacres went so far as to predict the approximate cost and the writer heard a very well-known American lumberman say, last summer, that it would cost the government $200 to $300 per thousand to produce lumber in France. As a matter of cold, hard fact, it is a well-established point here now that the forestry units of the United States Government are a remarkably good investment. The primary purpose of rapid production to meet immediate needs in the most economical manner by sending the men to France has been much more than satisfactorily realized.

Housing Conditions Nearly Perfect

The conditions of the troops are nearly perfect, everything that could be desired. The men are either housed or are quartered in tents floored and walled with lumber. They are well equipped with proper clothing and effects. Each camp has shower baths. The large size appetite that accumulates in a lumber camp is very satisfactorily treated three times a day with good, substantial, clean, well-cooked food.

Then there is the Y. M. C. A. with the attendant conveniences and comforts afforded by this institution to counteract the "blues"—the canteen for tobacco and sweets; books, magazines, free stationery, etc. There is always great interest in the athletic contests conducted by the "Y" in baseball, track, tennis, etc.

Besides the music by the various battalion and regimental bands, numerous vocal and instrumental musicians, American, French, English and Italian, some of whom have attained opera fame, appear at regular intervals to share their splendid gifts with "the boys."

Between times, in the different companies, improptu quartettes chant American favorites, accompanied, perhaps, by a mongrel stringed orchestra. The "local talent" is various and is always an interesting and important part of any camp.

The men that make up the forestry troops are a strong and hearty type and their patriotism and their attitude toward one another and toward their organization is most admirable.

Hard Workers, Every One

Just to relate a single instance—twenty-five men of one of the companies went out one evening without orders and on their own free initiative cut one hundred and twenty-five ties. One man can cut twenty-five ties in a day here.

The lumberjack, though he represents a non-combatant branch of our great army, has done and is doing his full "bit." His relative importance to our success in this tremendous conflict is real, and each man in the United States forestry troops can rightfully feel proud and happy to hold a place in this branch of the service.

Keep Up with the Neighbors

By *John Price Jones*

Ass't Director of Publicity, Publicity Department Liberty Loan Committee.

Your neighbors have bought Liberty Bonds. Have you? Your neighbors are going to buy more bonds of the Fourth Liberty Loan. Are you?

These are questions that all good Americans must answer. There is more involved in them than the customary friendly rivalry of neighbors. There is the issue of whole-hearted, thorough-going support of the Government in this war.

The purchase of Liberty Bonds is the one way in which every citizen can aid his country. All may not fight; all may not make shells or ships or dig coal or raise wheat. Most of the activities of war-making enlist the services only of special classes or groups of our citizens. But there is nothing specialized or exclusive about the purchasing of Liberty Bonds. Anybody with the price may subscribe, and the more who do, the better. The Government needs more money daily in order to keep the war going at top speed.

Secretary Baker said the other day that there were two ways of fighting the war—one to make every effort to "win quickly," the other to "proceed leisurely and win it late."

The Government has determined to win quickly. For that it needs your dollars, as well as your neighbors' dollars. Men are going to France at the rate of 300,000 a month—a tremendous acceleration of the rate at which the shipment of fighters was begun.

The Fourth Liberty Loan is to be far bigger than any predecessor. The dollars must flow into the Treasury far faster and in bigger sums than ever if the Government's plans are not to miscarry.

We must all lend a hand with this loan, whatever else we are doing in the way of war activities. Out of their small pay many of our soldiers buy bonds. Those of us at home surely ought to be able to do so. We and our neighbors, our friends and our friend's friends—the whole community of Americans working together—must put the Fourth Liberty Loan over the top with a will.

There Is Need for Co-operative Effort in One National Association

Much has been said of late concerning the necessity of uniting our co-operative effort in one national association. The new National Retail Lumber Dealers' Association is the logical vehicle for such an organization. It has responded to the demand for national unity of effort by extending an invitation to the state and regional associations to affiliate with it. Two of them have accepted this invitation, but the majority have either withheld their decision or declined to affiliate.

In view of the fact that the United States Government has requested all lines of business to be represented by an authoritative spokesman, why this failure to co-operate? This is the question raised by the National Association itself in its monthly letter for August. The answer is to be found in the proposed basis for affiliation. The present National Association is made up of the individual memberships of a comparative few large city dealers. It is proposed to receive the state and regional associations as associate members. In other words, questions might arise where a comparatively few individual members might completely out vote hundreds of dealers who happened to be in the dissenting majority. Government reports show that 90 per cent of all the retail lumber yards are in towns of less than 10,000 population. More than half the distribution of lumber is through the small towns. In a word, if the present National Association is to be truly representative of the industry as a whole, it must be controlled by a majority of the lumber dealers, not by a minority. Until we have representative association government, we cannot have a representative National Association.

We appreciate the fact that the city dealers, quick to see the value of organized effort, made the first move toward a national organization. They are entitled to much credit for their initiative. We believe they are big enough to see that their idea to be fully successful must comprehend the entire trade. We also believe that the officers of the National Association realize this fact and will readily agree to a democratic plan of organization and representation. The New York Association stands ready to consider such a plan. Let every state and regional association frankly state their views at the Chicago convention, work out a common platform, and then unite. With majority rule, we shall have unity and a truly representative National Retail Lumber Dealers' Association co-ordinating all of the activity for the benefit of the entire trade.—*The Lumber Carpenter.*

Decay in Buildings

Research was recently started by the Forest Products Laboratory to determine the "killing points" in temperature and humidity of common fungi found in American buildings. Field and laboratory studies indicate that much more care should be exercised in the selection of timber and in the construction of buildings to avoid conditions favorable to decay. A number of inspections of buildings which have given trouble on account of decay have shown that any one of the following causes may result in rapid deterioration of the building:

1. The use of green timber.
2. Allowing timber to get wet during construction.
3. Allowing the timber to absorb moisture after the building is finished because of leaks or lack of ventilation.
4. The use of timbers containing too much sapwood.
5. The use of timbers which have already started to decay.

The avoidance of these conditions will as a rule, it is said, prevent decay. In special cases, however, decay can only be prevented by preservative treatment. It is stated that for this purpose salts, such as zinc chloride and sodium fluoride, are better than creosote for buildings.

Every real American is on the job right now. He is either fighting on the front "over there" or doing his fighting with his money here at home.

BUY LIBERTY BONDS!

AS SEEN BY THE MAN ON THE ROOF

THE WAY TO SHINGLE A BOSTON HIP

In the August issue of BUILDING AGE there was an article on "The Way to Shingle a Boston Hip." Now, just what is the difference between a Boston hip and a New York hip, or any other kind of a hip, the author does not say. Presumably and probably they are all very much alike. So far as known there are only two kinds of hips, the other kind being the popular hip, hip, hooray.

But the value of shingling a Boston hip, or a hip wherever located, if it happens to be located on a boy, nobody will question. There was a time in this country, not so very long ago, when there was a disrespect for constituted authority that was shocking. There is reason to believe that it was due to laxity of parental authority and failure to shingle the juvenile hip when that was what the juvenile hip richly deserved.

As a matter of fact, the way to shingle a Boston hip is the same as the way to shingle any boy anywhere. Grasp the boy firmly in the left hand, so he cannot wiggle out of place, giving him at one and the same time a birdseye view of the woodshed floor and an idea of the muscle contained in your left arm. The shingle, perhaps it should be explained, should be held with equal firmness in the right hand and alternately raised and lowered with some vigor.

As the author well says, "If you do not fully understand shingling hips" you can "learn by actually doing the work." And the beauty of it is that, while you are learning something the boy will be learning something also that will be of value to him in all of after life.

There has been altogether too little shingling of hips in this country in recent years, and lovers of law and order, and of well-behaved and respectful children, will be glad to see the old custom coming back into vogue. For it is fair to assume that not all of our Presidents who grew up in log-cabins were made what they were by the logs merely; undoubtedly the heavy hand rived shingle also had something to do with the development of their future character and greatness. If American parents are going to resume the shingling of hips there will be plenty of people ready to shout, "Hip, hip, hooray!"

ANOTHER BUILDING BOOM

Eliza—Mandy Jones says they's gwine to add anothah room to dere cabin down in the holler.

Sue—Yas, Ah done seen her up to the store a-buyin' twelve ya'ds ob calico.

THE AMATEUR PHOTOGRAPHER

Neighbor—How did the kodak pictures turn out that Bill took in Italy?

Father—Why, the only building that didn't seem to be out of plumb was the leaning tower of Pisa.

ALWAYS THERE WITH THE COME-BACK

"That office boy in Smith's department," remarked the stenographer, "is a great kid. The boss has fired him about half a dozen times, but he shows up the next morning just as if nothing had happened, and Smith always takes him back on."

"Yes," replied the bookkeeper, who is a regular joker anyway, "he seems to be fireproof."

BUT PRESIDENTS HAVE BEEN BORN IN SUCH

Jones—What kind of a town is that town of Grassville anyway?

Brown—It is one of those towns where a train stops only on signal and a drummer on compulsion.

THE AWFUL AGROTIS

"How is the garden of Mary, quite contrary, getting along?"

"Why, it looks like food or cutworms would win the war."

TOWARD BERLIN

Civilian—It looks like the turning point of the war has been reached.

Sergeant—Yes, and it looks like it is the Germans who have turned.

A SNAP

Billiams—What is your idea of an occupation that must be a nice, easy job?

Boberts—Well, as far as the hours of work are concerned, I don't know any greater snap than to be an asbestos curtain in a theater.

LOGICAL

"What do you suppose makes the weather vane?"

"I suppose it is the wind blowing about it."

A DUMB GOOD IDEA

Waiter—We have a dumbwaiter to bring the food up from the kitchen.

Patron—Well, I wish that you also had one to serve it.

TOO COMMON THEN

Architect—I don't suppose that there ever was a woman who wasn't delighted at the idea of having a house of colonial architecture.

Husband—Unless maybe it was some woman during the Colonial period.

NOTHING TO SAY

Pessimist—The Americans are still four hundred miles from Berlin.

Optimist—Yes, but they are not nearly as still as Berlin is.

NOT KNOCKING NOR ANYTHING

Loafer—Did you see me put my hammer anywhere?

Boss—I haven't even heard you put it anywhere.

THE LOCK-STEP NEXT

Scot—The Kaiser is melting up his builders' hardware.

Yank—I knew that some day we would get his knobs.

FIRST AID TO THE INSECT

Architect—I wonder who first thought of the sleeping porch.

Householder—I don't know, but I imagine it was some mosquito.

POSSIBILITIES OF THE PATIO

In tropical countries nearly every house has in the center a large square or oblong space known as the "patio." It might be a good thing if it could be generally introduced in our American architecture. It might not be used in just the same way, but it would serve some other useful purpose.

In the tropics the patio is generally filled with flowering plants, and fountains, and mosquitoes. Sometimes it contains a palm or two, and occasionally a lizard.

Now the contents of an American patio would be different. It would be such a handy place to put things that clutter up the house that the foliage would probably be diverse. In place of the palmtree we would probably have a stepladder, and in place of a bubbling fountain a leaky washtub that we haven't had time to fix.

In fact, the patio would be as handy as a pocket in a shirt and as decorative as a city dump. Things crowded out of the house would gradually find their way into the patio, where they would always be convenient and in the way.

In the tropics the natives, it is said, go into the patio to take their siesta. But, as sleep is little practised in the United States, and in New York practically prohibited, the patio might just as well be used for something else.

UP

"Aviators say that the higher a thing is the safer it is."

"Well, the man who sells us our groceries seems to be a great believer in safety first."

OFTEN SO

Visitor—Is your new house generally satisfactory?

Owner—No, the only family in the neighborhood that seems entirely satisfied with it is ours.

New Catalogs of Interest to the Trade

Whitney Casement Window Hardware. Whitney Window Corporation, Minneapolis, Minn. An encyclopedia of beautiful architecture from all parts of the world which illustrate casement window hardware, consisting of screens, sleeping porches, sun parlors, etc. Booklet enters into a practical discussion of the workings and advantages of the casement window. Full designs are shown.

Hill's Dry-Cold Refrigeration for the Home. C. V. Hill & Co., Trenton, N. J. Catalog describes and illustrates all varieties of ice chests and refrigerators.

Standard Specifications of Painting for Buildings. Voltax Company, Bridgeport, Conn. A complete practical specification covering the different types of painting, varnishing and enameling required to finish the various surfaces in factories, mills, apartments, hospitals, hotels, residences, theaters, etc.

Johns-Manville Building Materials. H. W. Johns-Manville Co., New York City. Booklet gives an interesting story of asbestos and tests made by the company for its practicability. The second half of this book is given over to describing the roofing accessories, hair insulator, asbestos wood, asphalt mastic flooring, waterproofing and many other products of this company. Elaborate specifications are given for the asphalt mastic flooring.

New Electrical Catalog No. 33. The Steel City Electric Co., Pittsburgh, Pa. Describes and illustrates all the products of this company, and a complete line of electrical accessories is included. This book may be obtained upon request to the manufacturers.

The New Era in Street Lighting. Holophane Glass Co., 340 Madison Avenue, New York City. This book describes and illustrates the results of recent scientific research and shows how these results have been practically applied to street lighting. This book explains what is meant by conservation in street lighting and shows how to effect marked economies.

The Baker System of Industrial Transportation. Baker R. & L. Company, Cleveland, Ohio. Booklet describes electrical tractors and utility trucks manufactured by this company. Gives specifications of trucks and minute description of this company's product.

Doorways. Richards-Wilcox Mfg. Company, Aurora, Ill. A patriotic issue of this company's house organ, describing "the right idea in casement window hardware" and the advantages of the company's product. Short timely articles on patriotism round out the issue.

Concrete in Architecture and Engineering, Monthly—Portland Cement Association, 111 West Washington Street, Chicago, Ill. The August issue shows advisability of using reinforced concrete in industrial housing. Coal storage in concrete pockets is also taken up.

Doorways—Richards-Wilcox Mfg. Co., Aurora, Ill. The September issue discusses movie advertising. Has other interesting articles illustrating "Slidetite Garage Door Hardware."

Any of these catalogs will be furnished by the manufacturers. Or, if you prefer, we will see that you receive any that you desire. Just check the catalogs you want, tear out the page, and mail it to Building Age, 243 West 39th Street, New York.

Denby Trucks—Denby Motor Truck Co., Detroit, Mich. Catalog describes and illustrates better trucks. The trucks illustrated represent uses in every conceivable industry.

International Onepipe Heater—International Heater Co., Utica, N. Y. Describes and illustrates the "one-pipe" heater manufactured by this concern. Numerous testimonials are also contained.

Permanent Homes Make Permanent Workers—Truscon Steel Co., Youngstown, O. Describes and illustrates plans of industrial housing. Takes up general problems involved in present industrial conditions and points out the uses of stucco or Hy-rib metal lath for housing purposes.

Suggested Designs for Concrete Milk Cooling Houses—Portland Cement Association, 111 West Washington Street, Chicago, Ill. Contains plans for concrete milk-houses and explains their advantages.

Benjamin Two Way Plug—Benjamin Electric Mfg. Co., Chicago, Ill. Describes and illustrates a plug that gives double service from one socket.

Cast Stone—Atlas Portland Cement Co., 30 Broad Street, New York City. Attractive booklet on the newer aspects of concrete uses. Treats of cast stone, not as an imitation, but as a synthetic product. Of genuine interest to builders.

Protects the Corn—Milwaukee Corrugating Co., Milwaukee, Wis. "Netmesh" expanded diamond metal lath is described for use as lining of corn cribs, it rendering a corn crib rat and mice proof.

The Concrete Builder—Portland Cement Association, 111 West Washington Street, Chicago, Ill. The September issue of this bi-monthly devoted to the use of concrete for farm and home describes advantages of concrete piggeries, corn cribs, ice houses, stone barns, tanks and milk houses.

Alpha Aids—Alpha Portland Cement Co., Easton, Pa. "Turning Garbage Pails Into Boxes of Bacon," the leading article of this attractive booklet, gives some suggestions on quarters for the American hog, and also increasing the national supply of pork. The supplement of this worth-while issue is "Some Suggestions on War Time Building."

Re Shingles—Flintkote Mfg. Co., 88 Pearl Street, Boston, Mass. Describes and illustrates strip, wide spaced mottled strip and diamond strip shingles. All of these are slate surfaced. Red slate surfaced roofing in dark red and grayish green are shown.

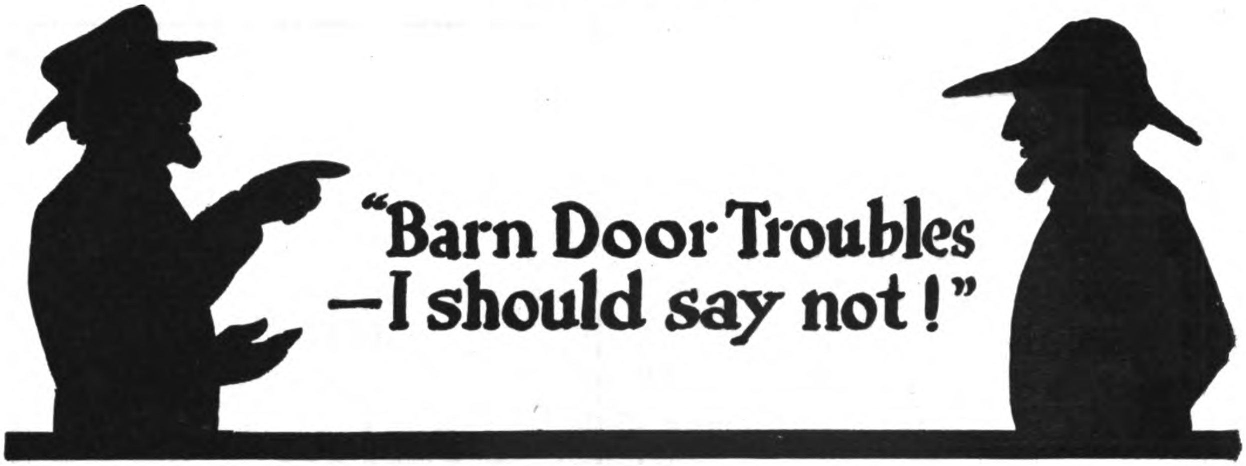
Natco on the Farm—National Fire Proofing Co., Pittsburgh, Pa. Booklet describes advantages of Natco glazed hollow tile in the construction of farm buildings. Plans and photographs of farm buildings, barns, hog houses, milk houses, garages, corn cribs silos and other construction are shown.

Natco Standard Fireproofing — National Fire Proofing Co., Pittsburgh, Pa. Catalog illustrates all the shapes of Natco hollow tile which are used in the modern fireproof building.

Industrial Housing — National Fire Proofing Co., Pittsburgh, Pa. Booklet traces industrial housing from its inception. Explains advantages of Natco hollow tile in this connection and illustrates notable industrial housing operations.

Builders Handbook of Natco Hollow Tile Construction—National Fire Proofing Co., Pittsburgh, Pa. Booklet containing plans and specifications for erecting hollow tile.

Hydrated Lime in Concrete Roads—The Lime Association Construction Bureau, Pittsburgh, Pa. Booklet shows the results of experiments in field test conducted by the Highway Department of Delaware.

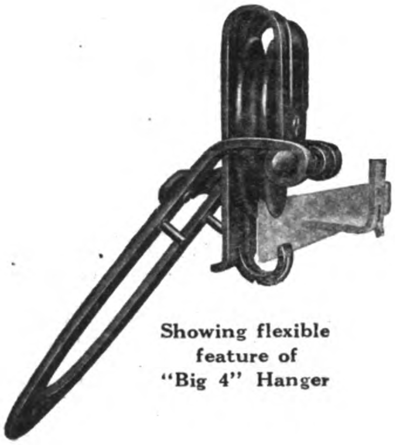


"Before I had the improved "Big Four" Hanger my doors used to stick and jump the track and cause all kinds of trouble!"

THE SLOGAN OF THE SUCCESSFUL FARMER IS—"BUILD BETTER BARNS"

To build better barns you must build better doors—to build better doors you must use better door hangers. You can't expect a door to work properly with a poor door hanger.

The door that sticks or gets off the track is one of the biggest nuisances a farmer has to contend with—and he naturally blames the builder for improperly hanging the door.

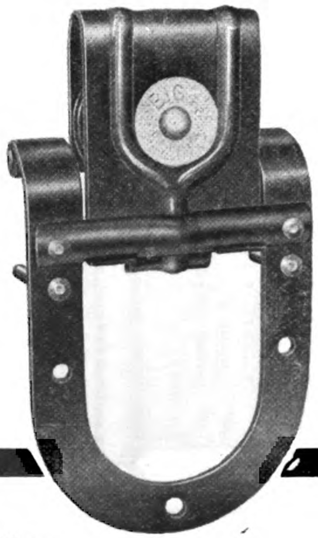

Showing flexible feature of "Big 4" Hanger

THE IMPROVED BIG 4 HANGER

eliminates all doubt in this respect. It will stay on the track—will not rust—will not stick. It swings out under pressure. It is easy to attach, flexible, well constructed from the best materials, possesses non-binding wheel housing, and anti-friction roller bearings. The sherardized axles and rivets prevent rust.

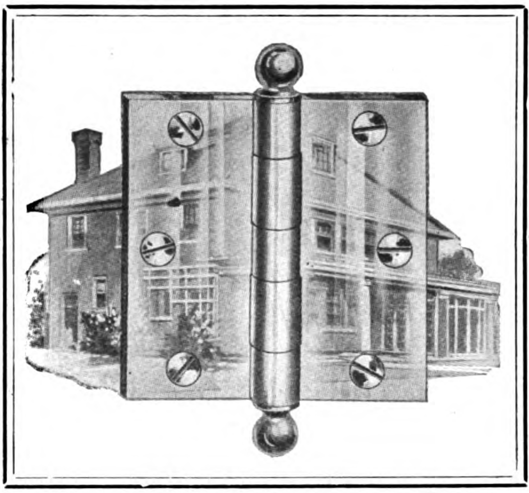
It is both a flexible and rigid hanger. The wide swing-out feature allows it to swing out and raise higher than with any other flexible hanger.

If your dealer does not handle the "BIG FOUR," send us his name. Catalogue sent without obligation.



National Mfg. Co.

STERLING, ILLINOIS



Your
ATTENTION!!

is called to the hinges on the door. To some people door hinges may seem rather small and unimportant—nevertheless, their mission in helping to make or mar the appearance of the rooms in a modern home is worthy of serious thought. The

GRIFFIN
"The Door Butt of America"

is designed along lines that insure both *beauty* to the home and *service* whenever the doors are opened and closed.

The Griffin operates freely and easily, it is amply strong for heavy doors and it is such a pleasing fixture that architects and home builders are glad to specify and use it.

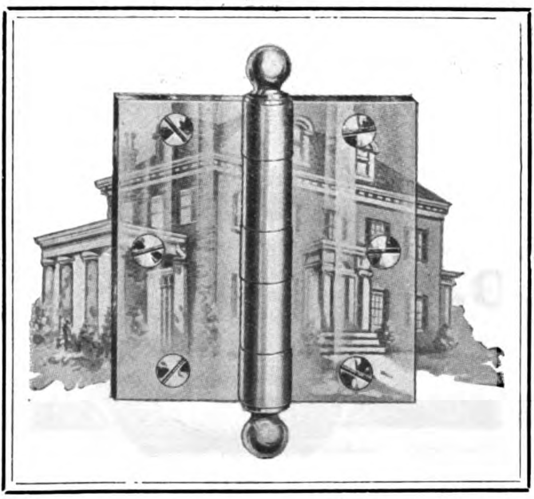
Being finished in the various Griffin hardware finishes, it is in wide demand for the better class of houses and office buildings.

Send for illustrated catalog and circulars.

The Griffin Manufacturing Company
ERIE, PENNA.

30 Warren St.
New York

17 E. Lake St.
Chicago



Used on the Better Homes—Why?

The better homes are most costly—and every piece of wood that goes into such homes must be carefully selected, measured, cut and fitted. Slip-shod methods will not do. Accuracy must be maintained. The only way to get accuracy is by using accurate tools.

TRADE MARK
Starrett
REG. U.S. PAT. OFF.
Tools

are recognized by carpenters and builders as standard for accuracy. They have in addition convenience and quick adjustment which save time and money. Our Catalog No. 21P describes 2100 styles and sizes of high-grade tools. Send for a copy.

The L. S. Starrett Co.
The World's Greatest Toolmakers
Athol Mass.

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Safety First

TEST IT

Subject a Corbin front door lock to any test you please and it will meet the requirements, The general strength and solidity; the easy latch bolt action; the quick, snappy response to the turning of the knob or key, and the little muscular effort required to operate; the small resistance in the use of the key, and the absence of sticking or binding; the sinuous key way and its safety against picking tools—all recommend the Corbin lock to architects and contractors who study their clients' interests. Any Corbin dealer will give you full details—or write us.

P. & F. CORBIN
The American Hardware Corporation Successor
NEW BRITAIN, CONNECTICUT

CHICAGO NEW YORK PHILADELPHIA

Sidewalk Ice Chopper

Made just like a chisel—Lasts a lifetime.

Keep your sidewalks clean with half the labor. This chopper has the weight and the cutting edge to go right through.

Order of your dealer today, for we are already oversold.

The L. & I. J. White Co.
100 Perry Street Buffalo, N. Y.

ORIGINATORS
OF
SASH CHAIN

The Standard for over 35 Years Capacity of chain plant 35 miles per day. Many imitators, no equal. Used by the United States Government for over 30 Years.

The Smith & Egge Mfg. Co.
BRIDGEPORT, CONN.

COPPER CABLE SASH CHAIN

Thomas Morton
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COPPER CABLE
STEEL CABLE
CHAMPION METAL
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SASH CHAINS

CHAINS

For Suspending Heavy Doors Gates, Etc.

All of SUPERIOR QUALITY

CHAMPION METAL SASH CHAIN

If Everybody in This Country Said

"I'd like to buy more Liberty Bonds but—"

Who would Win this War?

Buy Bonds to Your Utmost

This space contributed to winning the war by

MACK & CO.
Brown's Race & Platt St. Rochester, N Y.

Something For You

in our Pamphlet 29; viz.:

Valuable Tables for finding size of joist, safe load of joist, actual load on hanger, etc., etc.

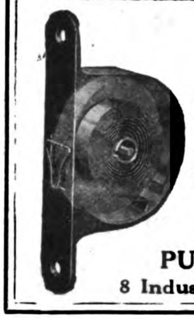
Some of these Tables are not in print elsewhere.

The Pamphlet and the Mounted Model Hanger will be mailed on request.

SOMETHING FOR US. We ask your special attention to items 5, 6, 7 on page 5 of the Pamphlet and to the matter on pages 23 and 24 relating thereto.

The W. J. Clark Co.
Salem, Ohio, U. S. A.

Pullmanize Your Windows



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Unit Sash Balances

cost less than cords, pulleys and weights, last longer, are neater in appearance, and a carpenter can install twice as many per day.

OVER FIVE MILLION IN USE

Recommended by architects everywhere, approved by Fire Underwriters' Laboratories and may be used in fireproof buildings.

Guaranteed for ten years.

Write for illustrated catalog and blue prints
See Sweet's Index, pages 764 and 765.

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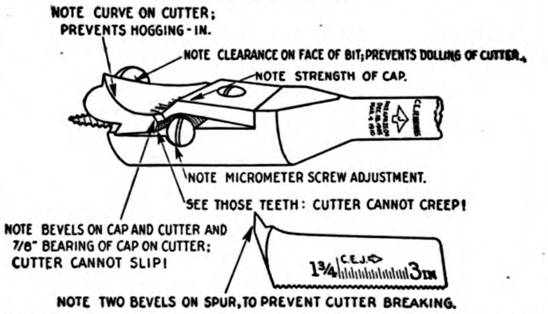
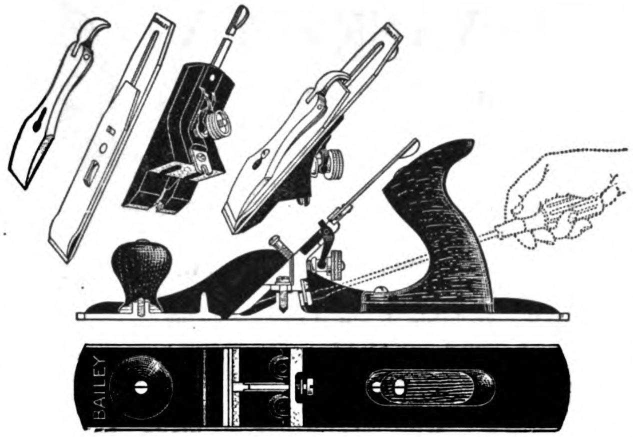
8 Industrial St. Rochester, N. Y.

C. E. Jennings ARROW HEAD Expansive Bit
STEERS PATENT



C. E. JENNINGS & CO., *Sole Manufacturers*, 71-73 Murray St., N. Y.



No. 3

No. 5

No. 4

No. 6

Stanley Tools

"BAILEY" ADJUSTABLE IRON PLANES

"BAILEY" IRON PLANES have been in use for nearly fifty years and are the recognized standard for planes of this type. While retaining all the original features, many valuable improvements in construction have been added from time to time.

In the illustration the detail of construction is very clearly shown. Note that the frog has a support directly at the rear of the mouth, making practically one solid piece from the cap to the bottom. The sides and bottom of the plane are stiffened by means of the cross ribs. The screw bosses on each side of the center rib are very deep, allowing a number of threads to engage, thereby securely holding the frog. The design prevents the plane being drawn out of true when the face of the frog is screwed up hard.

The width of the mouth may be regulated and made wider or narrower as coarse or fine work may require.

The cutter, which is thin and of uniform thickness, is a prominent feature of the "BAILEY" Plane.

Briefly, its advantages are: 1. Ease in grinding. 2. Less grinding, as a thin cutter can be kept in condition by honing. 3. Less tendency to "stub off" the cutting edge when honing, hence the original bevel is kept much longer.

It is adjustable endwise and sidewise, made of the finest quality English steel, tempered and ground by an improved process, and honed ready for use.

The handle and knob are made of highly finished, thoroughly seasoned rosewood.

All genuine "Bailey" Planes have the name "Bailey" cast in the bottom, and the name Stanley is stamped on the cutter. Planes with bottoms either flat or corrugated furnished as desired.

For Sale by All Hardware Dealers

Manufactured by

STANLEY RULE & LEVEL CO.
NEW BRITAIN, CONN. U.S.A.

The "Feel" of a Good Plane

gives pleasure to the expert workman; the work it does adds to his satisfaction.

SARGENT
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AUTO-SET
Bench Planes

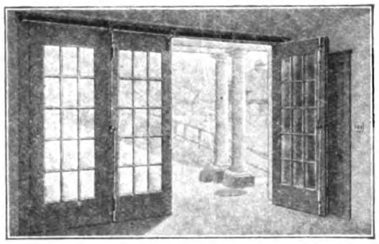
have the right "feel" and work perfectly. They are light, have ample handle room and the easily made adjustments are positive. The cutter operates without chattering; it can be removed for whetting and then replaced to exactly the same position without adjustment, this being the auto-set feature which is a great time-saver. These planes, which are made in six sizes, are intended for both heavy and very fine cuts and are especially adapted for working against the grain on cross-grained hardwood.

Descriptive booklet sent free on request.

SARGENT & COMPANY
53 Water St., New Haven, Conn.

When You Build a Garage Remember "Slidetite"

Acknowledged everywhere to embody more advantages for the garage user than any other style of garage door hardware made.



RICHARDS-WILCOX R-W AURORA TRADE MARK

Slidetite (Patented)

Garage Door Hardware

Simple to install, easy to operate, readily adjustable. Doors can't sag, stand where you open them without locks and holders. Close weather tight. Add to the appearance of the building.

Made in styles and sizes to fit any garage, public or private.

"Slidetite" gives satisfaction to the user and upholds the reputation of the builder.

Sold by the best hardware trade everywhere.

Richards-Wilcox Manufacturing Co

SAN FRANCISCO
LOS ANGELES
NEW YORK
CHICAGO

AURORA, ILLINOIS, U.S.A.
Richards-Wilcox Canadian Co. Ltd. London, Ont.
"A hanger for any door that slides"

PHILADELPHIA
MINNEAPOLIS
BOSTON
ST. LOUIS

"YANKEE"

RATCHET DRIVER No. 10

SAVES TIME AT EVERY TURN

Here you have—an easy working ratchet, right hand, left hand, (and rigid), a comfortable handle and withal a strong and serviceable driver.

Made in 8 lengths of blade, from 2 inch for small screws, up to 12 inch suitable for all kinds of high power house carpentering.

Your Dealer Can Supply

Let us send you a YANKEE Tool Book

NORTH BROS. MFG. CO.
Lehigh Ave., Philadelphia, Pa.

FORSTNER Labor-Saving AUGER BIT

Bores Any Arc of a Circle

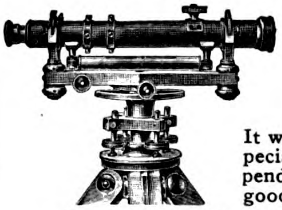
Many New Uses

The Forstner Augur Bit, unlike other bits, is guided by its circular rim instead of its center, consequently it will bore any arc of a circle, and can be guided in any direction regardless of grain or knots, leaving a true polished surface. Takes the place of a chisel, gouge, scroll-saw, or lathe tool combined. For core boxes, fine and delicate patterns, veneers, screen work, scalloping, fancy scroll twist columns, newels, ribbon molding and mortising.

Try it and be convinced.

The PROGRESSIVE MFG. CO.
TORRINGTON, CONN.

Every Builder



should investigate the superior merits of this

KOLESCH LEVEL

It was made to meet your especial needs and can be depended upon to always "make good."

This Level is light in weight, but is built for hard service and to last

K TRADE MARK

KOLESCH & COMPANY
138 Fulton Street, New York

RUSTLESS
ROOF NAILS
"ZINCLAD" CUT AND WIRE NAILS
FOR WOOD, ASPHALT AND ASBESTOS SHINGLES
SLATE, TILE AND METAL ROOFINGS
"ZINC CITY" SOLID ZINC NAILS
FOR SHINGLES, SLATING, SHEATHING, ETC.
RUSTLESS ROOF NAILS MADE TO ORDER
Write for Samples and Prices
W. H. MAZE COMPANY
PERU, ILLINOIS.

Money Makes the Ships Go!

By CHARLES M. SCHWAB

Despite the fact that we have made real progress in shipbuilding, it must be remembered by every patriotic American that the need for ships increases proportionately with the increase in the size of our fighting forces overseas. Transporting troops to Europe is only one-fourth of the task that our shipping facilities must bear. The other three-fourths is the carrying of supplies and munitions of war.

Ships cannot be built without money. In war time it takes *a great deal of money.* Undoubtedly after the war is over the ships that we are building now will pay for themselves many times over. *But the immediate need is money and the whole-hearted support of the entire nation.*

If the American people could visualize what has been done in our shipyards with the money that they invested in the first Liberty Loans, I am sure they would be as proud and as enthusiastic as I am. The ships that we have built and are building should persuade the most cautious investor to put his money into Liberty Bonds of the fourth issue.

Buy Liberty Bonds—They Are the Best Investment in the World!

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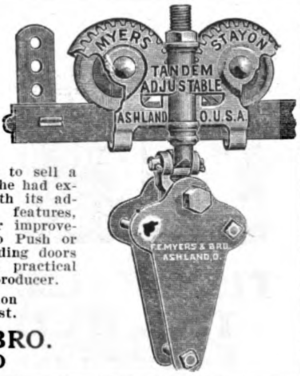

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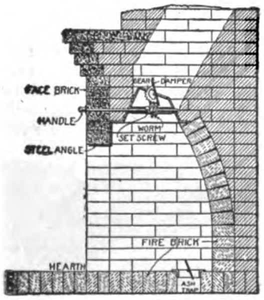

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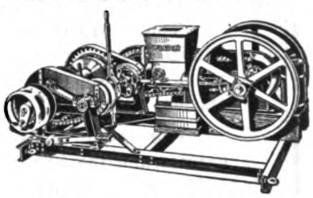

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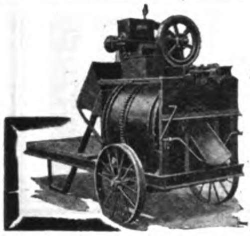

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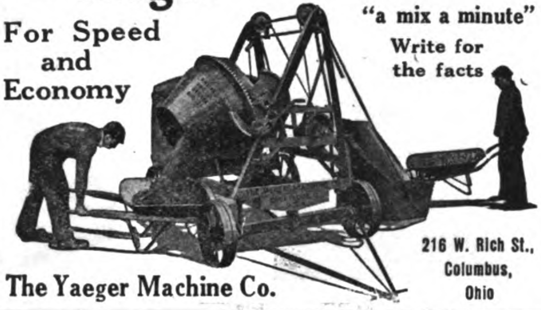

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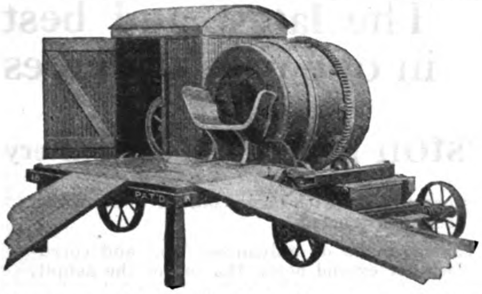

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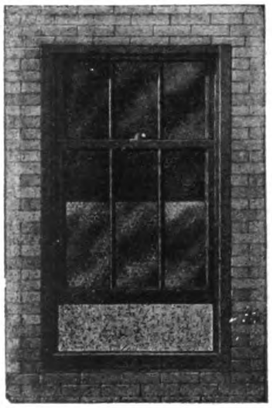

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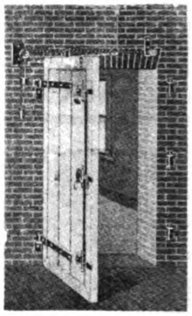

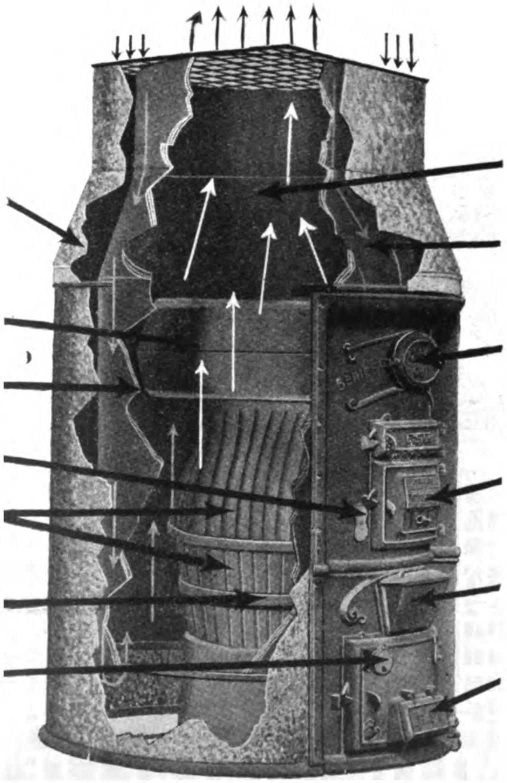

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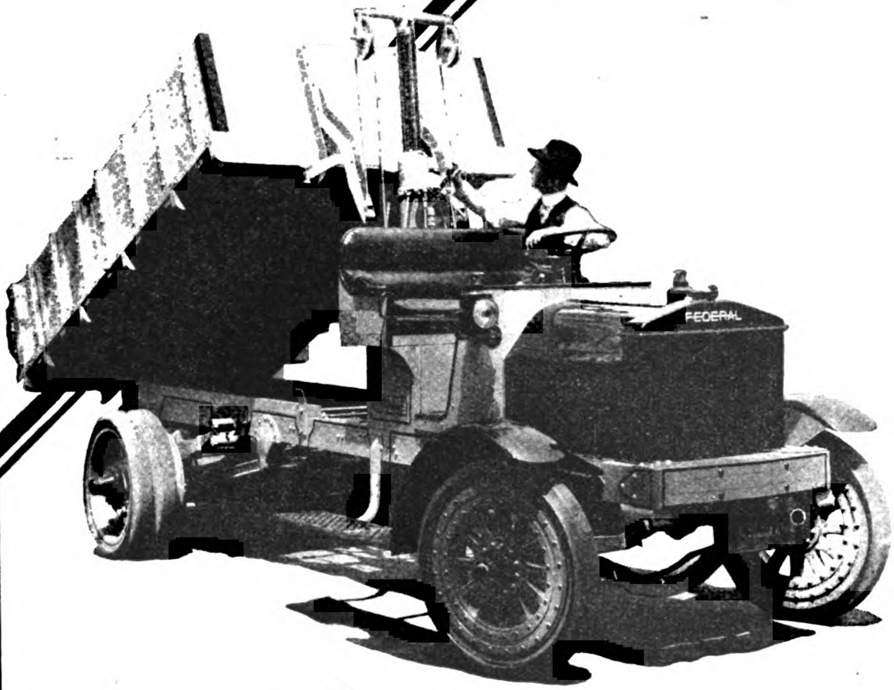
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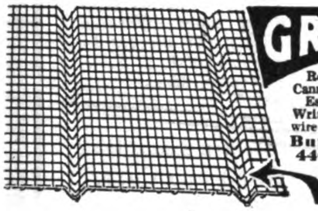
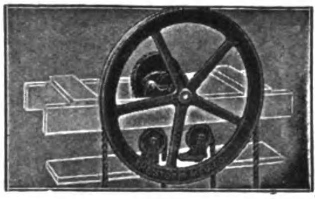
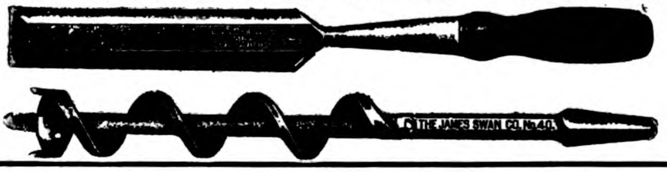





THE JAMES SWAN CO. No. 40

BUILDING AGE

New York, November, 1918

A Stone and Half-Timbered Home Built in Pennsylvania

Detail of porch.

The harmonious combination of varied building materials is an achievement none too common in modern architectural and building practice. There are some styles, however, that lend themselves more readily than others to accomplishing this result, as well as being easy of graceful and appropriate adaptation. The English half-timber house is one of the types best suited for these purposes, both as to design and materials. It is also readily adapted to localities; it is appropriate for the town house, for the suburban house and for the country house.

The dwelling shown in the accompanying illustrations is a very good example of a modified English half-timber house in a suburban community. It is a particularly valuable study because while it preserves all the characteristics necessary to the half-timber style, it is distinctly modern and distinctly American in tone. This atmosphere is created in large part by the use of local building materials, those which are natural to the surroundings, and hence the most appropriate. These materials, again, are not used in any affected or bizarre manner, but very simply. Field stone appears as such, plaster is ruggedly troweled on, while the shingling, which forms an important element in the design, is not "camouflaged" in any way. The only false element in the design is the timbering itself, which, instead of being actual beaming and structural in character, consists in creosoted slats tacked on the surface of the plaster. This is common modern practice, however, and not particularly to be condemned. Present day building methods do not require these timbers for structural purposes, and since they form a very graceful and interesting feature in design they have become purely ornamental, rather than structural members.

Next to the style of the house, and indeed of perhaps greater importance, is the plan. It is here that the chief interest lies, from the standpoints of livableness and economy, and it is from the plan that the other features of a house must be developed. The floor plans are made interesting, usually, through certain devices, among which the two most important are: either developing the plan upon a strongly defined axis, making it regular and logical in its outlines; or in making it sufficiently irregular and "different" to stimulate interest and give some degree of uniqueness and originality to the house. The former method usually has more repose, but the latter very often saves a house from monotony and makes it more livable.

A harmonizing variety of materials lends charm to this beautiful English half-timber home.

This is true of the house under discussion, but it may also be said of it that it is in no way extreme or freakish, and that while it embodies many unusual points, it is still a comfortable, dignified home. From the photograph of the front of the house, although partially concealed by shrubbery, it will be seen that the entrance porch is formed by a projection of the main roof, supported by two massive columns of the same kind of stone as the first story of the house. It enters upon a central passage which is a dividing line between the living and dining portions of the house. It serves as a stairhall as well, and has a closet under the stairs for coats. This hallway divides the living and dining rooms much more completely than is usual in the small house, where there are very often double openings centered one on the other leading into these rooms from the passage. In this house there is a double opening into the living room from the hallway, but the entrance to the dining room is through a single doorway, which is *not* centered on the entrance to the living room. Neither is this doorway centered on the dining room wall, nor is the window on the opposite wall centered on its wall or on the doorway. This treatment persists, it will be noted from the plan, in two walls of the living room, giving a delightfully irregular air to the whole scheme.

The rear of the house.

Entrance to the kitchen is to be had only through the pantry, which is in reality more of a passageway than a room for stores and service. The two doors would help very materially in preventing the escape of cooking odors into the living portions of the house.

The rear stairs, it will be observed, are shut off from the kitchen by a door; beneath them are the stairs to the basement. Ample room is provided in the kitchen and pantry for necessary dressers and storage spaces. Additional room is afforded by the small closet which opens off the kitchen.

A valuable and unusual feature lies in the fact that the laundry is provided on the main floor of the house. This makes it a light and cheerful room, readily accessible, and not the remote and gloomy chamber of horrors that some laundries are, even in well appointed homes. This laundry also serves more or less as a rear entry, since the only access to the kitchen is through it.

Another unique feature, for a house of this type, consists in the provision of a small toilet, accessible only from the outside of the house. This is a very useful idea, since an installation located as this is could serve not only for persons employed out of doors, but for house servants as well.

As one mounts to the second floor of this house it is to be observed—and this is also readily apparent from the plans—that the stairwell is very well cut off, being surrounded on three sides by solid wall. This stairway continues up, in the same well, to the third floor, where there are two bedrooms, bath and a large, unfinished storage space.

Attention should be given to the fact that there are three bathrooms in this house, a practice which should by all means be followed wherever possible by builders of smaller houses. The day of the "annual bath" has passed long since, and the daily tub has taken its place in the average family. And in most homes the family habits are so arranged that this necessitates almost a bathroom for every bedroom.

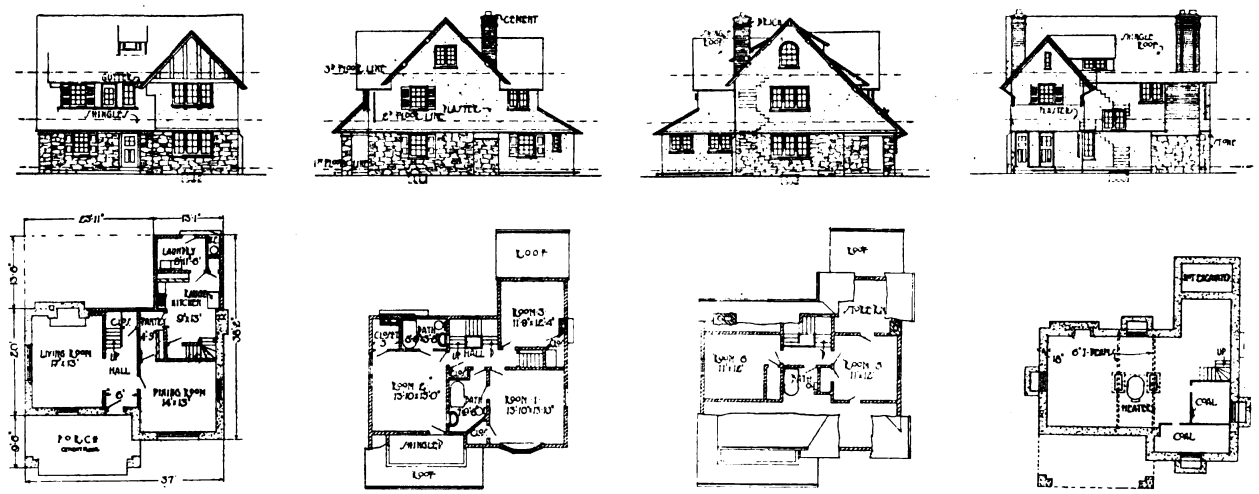
Note the ingenious way that space has been taken from the various bathrooms to provide closet room. Two have been grafted from Bath No. 1, one from Bath No. 3, while a large closet, 5 ft. 0 in. x 5 ft. 8 in. is provided next to Bath No. 2.

Another attractive feature of this house is the second story balcony, which can be seen from the photograph of the front elevation. This balcony, which makes a cut into the main roof, opens into Bedroom No. 2, and is made cheerful with gay window boxes. An offshoot of the main roof provides a covering for it; it is walled up to railing height and shingled on the outside.

Altogether the effect produced by this house is very pleasing. The combination of the various materials—the stone, with its wide mortar joint, the rough surfaced plaster, and the beaming and shingle work—is very good. The stone work, it will be observed, is carried up from the ground. Footings and foundation are of the same material. This stone is also found in the fireplace of the living room. One can observe from the photograph of the mantel piece that this material is used even for hearth stone and fire back, a very unusual treatment.

The mouldings and other wood trim in this room are very graceful and delicate, and stand out well in contrast with the rather massive fireplace. The flooring of living room, dining room and hall is of No. 1 white oak, 2½ in. face, treated with one coat of starch paste filler, a coat of white shellac and a coat of wax. The woodwork in hall and dining room is also painted white, including the stair rails. The hand rail is filled and stained in imitation of old mahogany. The treads and risers are of oak. They were filled

The living room is finished with simple yet attractive trim



Plans and Elevations. Scale 1/32" = 1 ft.

natural and given two coats of Berry Bros.' liquid granite "A."

For pantry, kitchen, second and third story floors "C" grade Georgia pine, rift sawed, was used. These floors were well scraped and sanded, and the second story floors were given a coat of liquid filler, a coat of white shellac, and a coat of wax.

Birch doors with poplar finish were used throughout the house, except that the front door was 1¾ in. white pine, and the service and third floor doors were 1⅜ in. cross panel Oregon pine.

Herringbone ceramic No. 1 tile floors and 6 in. sanitary bases were provided in both second floor bath rooms.

This house is electric lighted and has also a very convenient system of electric bells. The front door push button rings to kitchen and third floor hall, and a buzzer with socket in dining room floor also rings to these rooms, as does a push button in Bedroom No. 1. This enables one to call a servant from bedroom, dining and living rooms, and also arranges that no one but the servants shall be disturbed by the ringing of the front door bell.

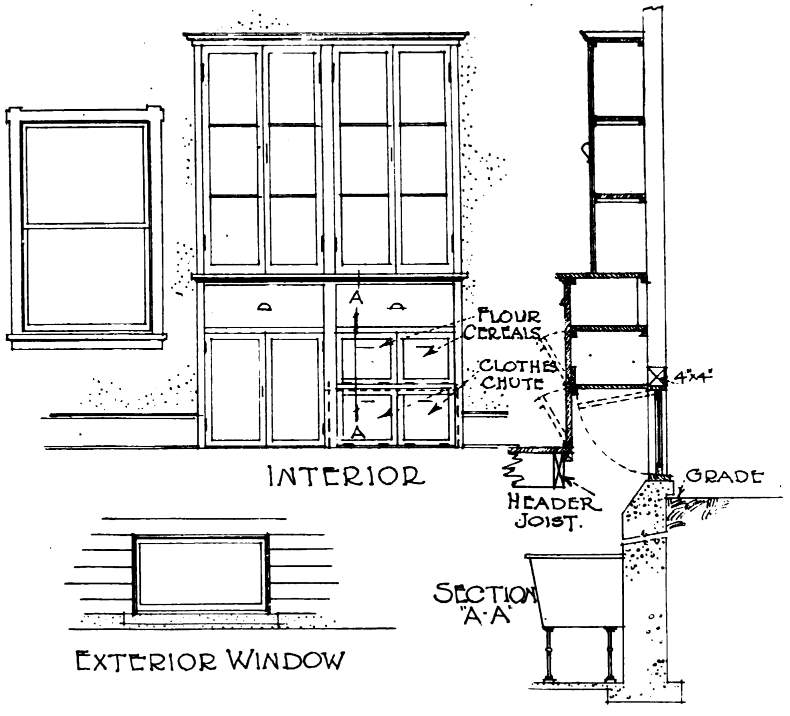
A hot water heating system is installed, with direct radiation in all rooms, including kitchen and laundry. An Acorn cabinet gas range is installed in the kitchen.

The house was built at Wynnewood, Pa., in accordance with plans and specifications prepared by McIlvain & Roberts, architects, Land Title Building, Philadelphia, Pa.

A Handy Kink in Placing a Cellar Window

By J. J. Birnbaum

This form of construction can be used advantageously in a small house where a single window to the cellar is required at a minimum of cost and also doing away with an area. The dresser set in the kitchen against the outside wall so that the window occupies the lower right-hand side (indicated by dotted lines). At the left the lower part of the dresser is used for utensils, etc., as usual, while the other half is divided up into three compartments, the upper being used for flour and cereals, while the lower is used for a clothes chute, dropping the old clothes, etc., near the wash trays. If a larger window area is required why the second half of the dresser can be used for that purpose.



This kink shows how to place a cellar window above grade when the floor line is near grade. The section "A-A" shows the manner of construction clearly. This method is especially useful in the colonial house with foundation walls carried but a few inches above grade.

A Roof Truss for Eighty-Five Foot Span

Steel Could Not Be Obtained, So the Designer Had to Utilize Wood. This Article Shows How the Truss Was Put Together

By Richard Shepherd

Under normal conditions, or in localities not affected by building regulations, a triangular wood truss might not provide the most economical method of supporting a roof over a clear span of eighty-five feet.

In this instance a wood truss was used owing to the fact that a law in this State, Pennsylvania, requires first class construction (fireproof or fireproofed steel) for floor areas in excess of seventy-five hundred square feet, whereas slow burning construction (heavy timber) is permissible where the floor area is not in excess of fifteen thousand square feet. The reason for this is that the light sections used in steel trusses fail very rapidly under intense heat, while heavy timbers retard the failure for a much longer period.

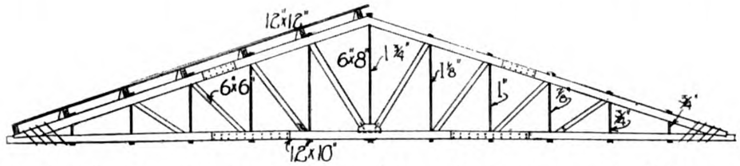


Fig. 1—Elevation of truss. Notice that the splice plates are placed between panel points.

This truss was used in the garage illustrated herewith.

A clear span was desired to eliminate the hindrance caused by columns or piers which would of necessity have been used along the center line of the building to support a double-trussed roof. This feature also secures a better lighted, better ventilated, and more attractive interior.

The question of increased cost was carefully estimated and the following comparison was found between the wide span truss and a double-trussed roof:

The increased cost of lumber amounted to 14 per cent, owing to the increased dimensions of timber required for the wide-span truss.

The labor of framing and erecting trusses was about equal in both cases.

The cost of iron-work for the wide span was double that for the double-trussed roof, chiefly on account of the material needed for splicing the principal members.

The increased cost of the completed structure was about 10 per cent more than the estimated cost of the same building with a double-trussed roof.

Wood trusses of this type are out of the ordinary for spans of such length, and the details for this reason should prove of interest to builders.

The principal feature is the method of making the splices. It is not recommended that this be resorted to as an economical measure, as the added cost of materials and labor is found to be far in excess of the saving due to the lowered cost of the short length timbers. It is not usual to find large timbers of the required dimensions and lengths in local stocks, especially when the government is in need of the entire production of large timbers for shipbuilding and other wartime industries.

The timbers used were long-leaf yellow pine, mill planed. The dimensions were as follows: Top cord was 12 x 12-in., the bottom cord of tie-beam was 12 x 10-in., the struts in the four middle panels were 6 x 8-in. and the remaining struts were 6 x 6-in. The strut block was of hard white oak.

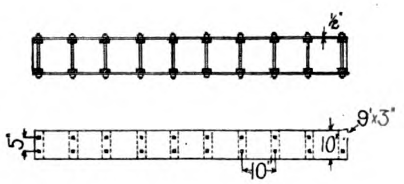


Fig. 2—Section and elevation of tie beam splice.

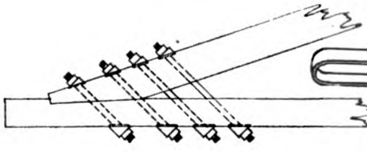


Fig. 3—Heel joint of truss. Note absence of straps, special washers, or elaborate heel cut in timbers.

The tie-beam is spliced at the panel point. The old theory of making a half joint or joint of similar form is here abandoned, and a plain butt joint is found entirely satisfactory since the plates and bolts are designed to take all of the tension. The bolts secure better resistance in this form of joint.

The steel plates for this size are 9 ft. 3 in. long by ½ in. by 10 in. The bolts are ⅞ in. and are spaced 12 in. on centers with a space of 5 in. between the two rows.

The holes for these bolts through the tie-beam should be draw-bored so that the joint will remain tight when the truss is set and the tie-beam takes the tension.

Figure 2 shows a front view and a sectional plan of the tie-beam splice. The shear blocks are clearly shown in both views. These are made of cast iron, and are 3 in. x 1¼ in. x 10 in. in size. They are designed to add resistance against tension and are required by the city regulations but their practical value is frequently questioned owing to the fact that they displace so much of the timber area and leave so little timber between the blocks. Unless they are tightly fitted much of their value is lost,

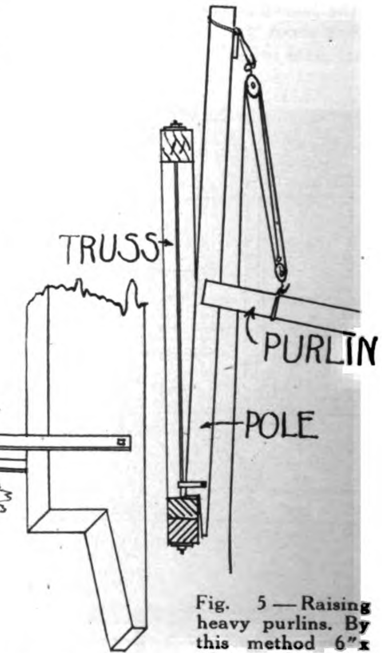


Fig. 4—Detail of pole intended to minimize labor in raising purlins. Its use is shown in Fig. 5.

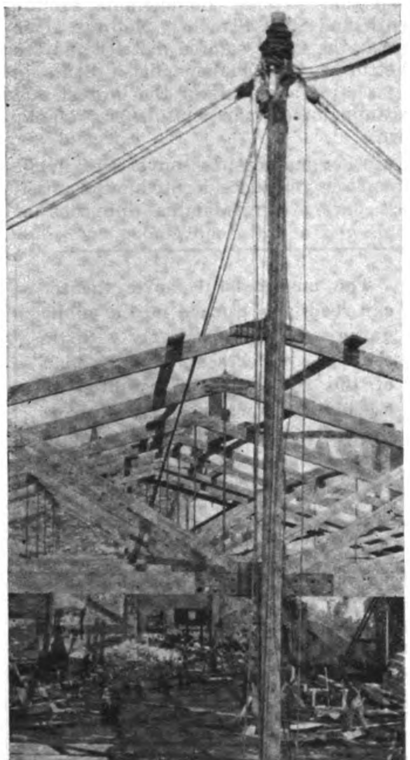
Fig. 5—Raising heavy purlins. By this method 6"x 10" purlins 18' long can be set at an average cost of 50 cents.

or they might be made worthless. An instance is on record where a builder bolted the shear blocks on the outside of the plate instead of cutting them into the timber, and his error was not discovered until the trusses had been erected in place.

I have observed several hundred splices in which both methods have been used and have not seen defects due to either method, so it is safe to assume that bolts and plates designed to take all of the tension, and properly constructed, will meet all practical requirements.

Figure 1 shows that the splice plate for the top cord is placed between panel points. This splice is designed for stiffness in the same manner that a column would be spliced. The plates are 12 in. wide and 4 ft. long of ⅜-in. steel. Each splice has twelve 1-in. through bolts.

The most economical method of boring the holes for bolts is by means of an electric drill. By this method 1-in. holes can be bored at the rate of 1 in. per second, so that the saving that would result from the use of such a drill, especially where more than a thousand holes are to be bored, is apparent.



A picture taken when work was well under way.

The location of the holes is first marked on the timbers, using the plates to indicate the exact locations. Two men are employed; one man operates the drill and the second man sights the direction of the drill, to keep it on the proper line, by means of a steel square placed upon the timber, or by similar methods. The holes should be bored half way through from each side.

The design of the heel joint, shown in Figure 3, is a departure from the usual theory or practice, and is of interest on account of the absence of wrought iron straps, special cast washers or elaborate heel cuts in the timbers.

The cut shown is made simply to facilitate the assembling of the truss. The heel bolts are designed to resist all stresses occurring at this point, but as an extra precaution the cast-iron beveled washers are sunk into the wood for a distance of one-quarter of an inch.

The practice of the City Bureau of Building Inspection is to incline all heel bolts at an angle of 45 degrees with the bottom cord. This has proven to be quite practical, but it is more difficult to bore the holes and assemble the trusses with bolts at this angle than with bolts at an angle of 90 degrees with the top cord, as was the previous practice.

The washers are made 10 inches wide.

Good practice allows a reasonable value for the section of the bottom cord which resists the thrust of the top cord, which should be taken into consideration in designing the heel bolts. The value of this lug in resisting shear is frequently taken as the area of the section x the unit shear parallel with the grain, which for long-leaf yellow pine is 100 pounds per square inch. This value is to be deducted from the total stress in the tie-beam and the heel bolts are designed to take the remaining stress.

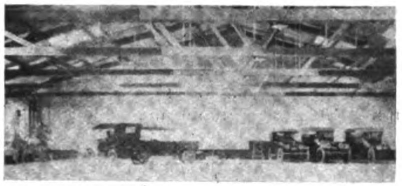
The trusses should be assembled in a position most convenient to the point where they are to be erected. They should be assembled on piles of from 3 to 4 trusses, with the bottom cords parallel to and near the longitudinal center line of the building and the apex of the trusses toward the outside walls, so that they can be raised without unnecessary strain on the joints.

The trusses illustrated here were raised by means of two poles. On spans of 60 or 65 feet, four experienced men with one pole have raised and set in place from four to five trusses in an 8-hour day.

The truss has a camber of 6 inches. The king rod is 1¾ inches. The other rods in consecutive order are 1⅛, 1, ⅞, ¾ and ¾-inch. The heel bolts are 2 inches in diameter.

Figure 4 shows one end of a pole designed to raise purlins with the minimum labor.

Two poles are made of 3 by 10-inch yellow pine about 18 feet long. One pole is set on each truss in the bay where purlins are to be raised. The bottom is cut, as shown in the illustration, to fit against the tie-beam and rest on the strut block. The pole is secured at the bottom to the king bolt by means of the strap iron band shown. This band is secured to the pole by a bolt or pin which can be readily removed when the position of the pole is changed. The top of the pole is secured to the top of the truss by a rope sling which should be of sufficient length to permit a free swing of the pole to land timbers on either side of the ridge. Double run pulleys are used.



Interior of garage in which these trusses were used.

By this method, using two carpenters to land and set the purlins on the trusses and two carpenters with two helpers to raise them, 6 by 10-inch purlins up to 18 feet long can be set at an average cost of fifty cents each or less, based upon the union scale of wages in Eastern cities.

The sheathing for this roof was 2 by 8-inch N. C. pine, tongued and grooved and surfaced one side.

Some Hints on the Use of Screws

By Henry Simon

When you hang a door or window pick out the screws with the well-formed slots and reserve them for the overhead work. It will take only a few seconds and you will save time and annoyance, for while you have a fine chance to handle a poor screw properly on the low hinge, the same screw is almost certain to cause trouble when used high up, where you can neither see as well nor apply as much power.

When a screw absolutely refuses to go when driven either by automatic screwdriver or with a brace, set the brace on the ratchet and drive, giving the brace only a quarter turn. This enables you to hold the brace absolutely true, while the sharp little hammer-like blows you can thus give will move the screw when it cannot be driven by continuous rotary motion.

Don't use machine oil or grease on a screw that is hard to drive in order to lubricate it. Use boiled linseed oil instead. It is well to keep a bottle with a small quantity in the tool chest. Common oil or grease does not dry, and will permanently prevent the screw from being held with the proper amount of friction. Linseed oil does the very contrary, for it dries quickly and, in drying, helps to cement the screw in the wood.

Turning "White Elephants" into Profit Makers

This Article Gives Several Examples of How Remodeling Jobs Were Obtained by Suggesting Changes to Owners

By Robert F. Salade

In various sections of the city of Philadelphia there are numerous large three and four-story houses which originally had been built for the living purposes of single families. As smaller and more modern homes were erected in the suburbs of the city people gradually moved from the older and larger buildings to the new houses. In some cases the older houses, which are built of brick, in solid rows, have been vacant for several years past. For the most part it would not be an expensive proposition to have these buildings remodeled into three or four-floor apartment houses.

Row houses, which often become unpopular after having been built for some time, can frequently be remodeled into apartment or flat buildings. The builder who suggests remodeling jobs like this will generally find that the owner is only too glad to have the work done. It turns a "white elephant" into a profit maker.

In the writer's opinion, the reason why it would not be too costly for the owners of some of the larger three and four-story houses to have them converted into apartments is because the buildings are so constructed that it would be comparatively an easy matter for the builder to make the necessary changes. As a rule, there is a bath-room on each of the upper floors of these larger houses. There is a sufficient number of rooms on each floor to make a spacious "flat." There is usually a good-size yard in the back of a house of this kind, and, if desirable, part of the yard could be used for an extension to the back of the house.

Some of the Philadelphia builders, on their own initiative, have reconstructed a considerable number of old-fashioned row-houses into three, four and five-family apartments. These ventures, in all instances, have been very successful. The owners of the buildings have no difficulty whatever in renting the floors, where before the old houses had stood idle for many months. What is still more important from a business standpoint, the owners now are receiving three times the amount of rent they had received when the old houses had been occupied by single families.

In the following paragraphs the writer will attempt to give facts concerning different varieties of reconstruction work which certain builders of Philadelphia have been engaged in during the last few months. It is hoped that some of the improvements which will be described will be of helpful interest to master builders of other cities. The purpose of this article is to illustrate the business conduct of the modern master builder—to show how the builder may create new business for himself as well as for others by planning improvements in various kinds of buildings.

To return first to the subject of converting dwelling houses into small flat houses one builder has recently completed an improvement of this class which is a somewhat unusual accomplishment, and which may lead up to many additional improvements of the same character in the near future. The house was of the ordinary three-story brick model, located at the end of a row of the same kind of homes. Being at the end of the row, the side of the house facing along one street, and the front of the house facing the other street, there was the advantage of numerous windows on two sides of the building, in addition to the windows in the back.

Ideas that show how work can be obtained are always worth while and interesting. The experiences of a Philadelphia man, as related here, will undoubtedly prove of value in suggesting ways by which profitable business can be developed.

There was a yard in the back of the house. About half of this space was used for building a three-story extension to the building. The three floors were laid out to form three flats of six rooms and bath each. The door-way which had formerly been at the front of the house was discontinued and a new door, hall and stairway were built leading from the side of the house. A hot water heating system, of larger size than the one which had been used previously, was installed in the basement.

This idea of converting a medium size three-story house into a "three-family house" should be of interest to other builders. Houses at the ends of rows are best adapted to the plan. It should not be difficult for the builders to get the owners of such property interested in the proposition. In Philadelphia the monthly rental of a good three-story house is from $35 to $45. With three flats the total rent would be three times that amount. We are speaking now of an apartment house located in a nice neighborhood.

It is a peculiar fact, however, that while well-bred people will move away from houses which are located in a section of a city where the foreign element is rapidly invading, let a builder put up a first-class apartment house right in the heart of a "run-down" district of a city, and refined people will come and rent the apartments. The writer has in mind that part of Philadelphia around Tenth and Pine Streets. Not far from here is the great colored district and the Ghetto of the Quaker City. Still, in this section are some of the largest and best-appointed apartment houses of the town.

Another builder has converted a large three-story residence, located in the northwest part of Philadelphia, into one of the most attractive "six-family houses" which one may find. The brick front of the house was taken out and in its place have been constructed three "built-in" porches, finished in brownstone. On each floor are two complete apartments, one in front of the house, the other in the back part. At the back of the house are porches and stairways leading to the yard. Some few months ago, when this was a one-family residence, it was a hard matter to keep it rented. Now that it is a six-family apartment it is constantly occupied, and the owner is receiving monthly rents of several hundred dollars.

The unsuccessful movie theater can readily be turned into a public garage. Comparatively little changes are necessary, for the plan of the two types of buildings is essentially the same. Or perhaps the movie can be changed so as to be suitable for light manufacturing purposes, etc.

Many builders and contractors of the "cold weather cities" of the United States are now developing a new and profitable business in storm-doors and storm-windows. These builders are advertising the fact among the people of their localities that storm-doors and windows on houses as well as stores and various other buildings can be made to help cut the cost of heating. The United States Fuel Administration is naturally

in favor of the people putting storm-doors and windows on their homes, as it means not only more comfortable homes during severe cold weather but a considerable saving in coal and wood as well.

The storm-windows are by no means a new idea in the city of Philadelphia, or other cities for that matter. In that part of Philadelphia where some of the first brick houses of the city were erected, and where some of the early houses still stand, it is interesting to note that a number of these old dwelling places were fitted up with storm-windows which are of the same design as those made at the present time. In some cases the old storm-windows are on the interior of the house. In other instances they are on the exterior.

It is safe to say that there is a promising future for storm-doors and windows for both private houses and business buildings. What may be called a new idea is an extended storm-door for the fronts of houses equipped with porches. A door-way of this type, built in the Colonial style, of wood and glass, makes a handsome appearance. Another good idea for an open porch of a house is in having a glass-and-wood partition built for the side of the porch near the door of the house. A partition of this kind breaks the winds and keeps rain and snow from reaching the porch near the door-way.

The common-place 5 or 10-cent moving picture "theaters" are things of the past so far as the larger cities are concerned. To-day the people flock to the new and better "motion picture palaces," which in numerous instances are beautiful pieces of architecture, and the result is that a considerable number of the old-time picture houses in Philadelphia and other towns are standing vacant and are falling into decay.

Through the efforts of one builder two or three of the abandoned moving picture theaters have been reconstructed into spacious garages. The work of improvement has been done at comparatively small expense. The principal work was in changing the fronts of the buildings. Only slight changes were necessary on the interior. The concrete floor was already in. A wide door-way was put in the back of the building and one was built, of course, for the front also. With several repairs to the roofs, the buildings were ready for the useful purposes of motor truck garages.

Another old moving picture house of Philadelphia has been remodeled to suit the requirements of a mission church. Still another has been fixed up for the purposes of light manufacturing. The enterprising builder can think of various other uses to which a remodeled moving picture house may be devoted.

In Philadelphia there is a fine old church which, by reason of its location, has been closed for several years. A real estate man was asked to sell the edifice at a fair figure, but he discovered after awhile that it was not an easy matter to sell a church in that neighborhood. Finally, the real estate man had a talk about the church with a friend of his who was a builder. The builder hit upon the idea of remodeling the church for the purposes of a manufacturing plant. The real estate dealer soon had the proprietor of a printing office, who wanted a larger place, interested. The church was sold to the printer, and the builder is to make the essential improvements.

In securing remodeling work, it is necessary to carefully study neighborhood conditions and possible uses to which the building can be put. A building which is for sale can frequently be disposed of if the builder goes to a man who can make use of it when remodeled, suggest the changes, and secure profitable developments for all parties concerned.

Mr. Master Builder, are you planning for the great rush of new business which will surely come after the wars? Are you keeping in touch with the changes which are constantly occurring in your city? Have you observed certain old buildings which could be improved and used for business purposes at moderate cost? "In time of war prepare for peace."

Partition Construction—II

Proper Methods of Bridging and Trussing Are Explained

By Ernest Drah

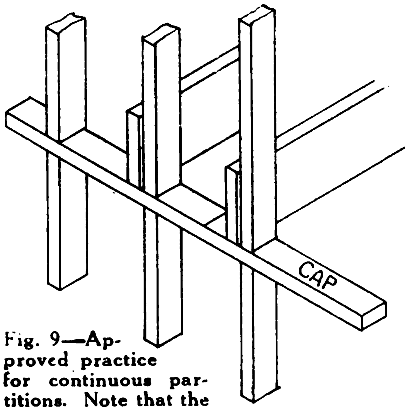


Fig. 9—Approved practice for continuous partitions. Note that the second-story studs are placed directly on the cap, *not* on the floor joists.

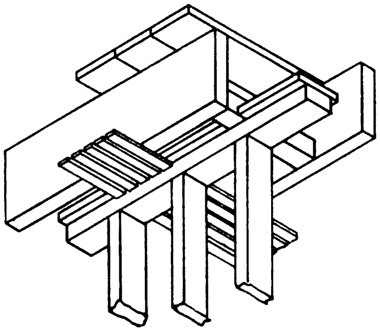


Fig. 10—A good method of framing partition heads when the cap comes between joists.

A partition is generally finished at the top with a cap, as shown in Fig. 9. This shows the usual approved practice where partitions are carried directly from one story to the next.

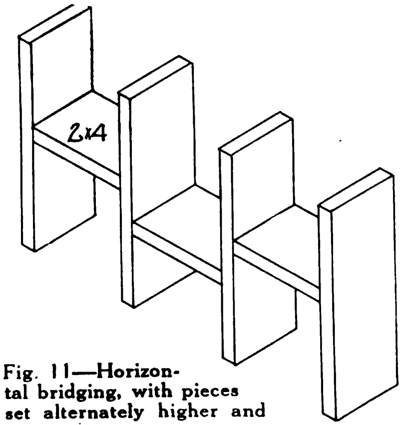


Fig. 11—Horizontal bridging, with pieces set alternately higher and lower.

Where a partition head comes between joists it is constructed as shown in Fig. 10. Boards about 3 in. wider than the cap are nailed to the cap; cross pieces are cut in between the joists, the board

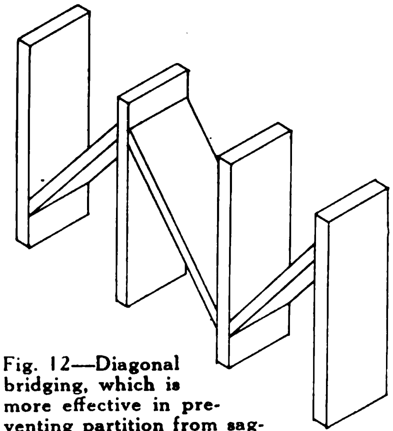


Fig. 12—Diagonal bridging, which is more effective in preventing partition from sagging than the method shown in Fig. 11.

butting up against them as shown. The object of the projecting boards above the cap is to provide nailing surface for the lathing.

A partition should be bridged at least once in its height. The bridging should be 2 in. thick and the full width of the studding.

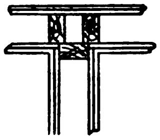


Fig. 13—Where partitions intersect the corners should be made solid. This illustration shows a good method.

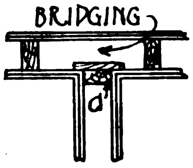


Fig. 14—A method of constructing corners, not so good as Fig. 13. The stud "d" should be nailed to the bridging. The board nailed to the stud affords nailing surface for the lath.

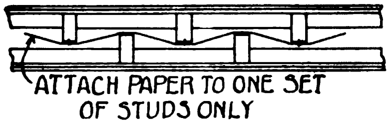


Fig. 15—A partition can be soundproofed by the method here shown.

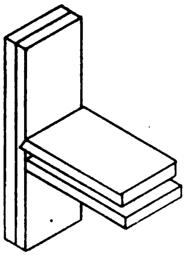


Fig. 16—In framing headers over an opening, it is good practice to keeps the upper timber 1" above the lower. This keeps the door finish from being effected if there is any sagging.

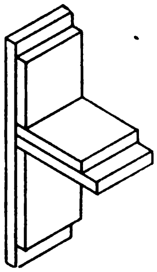


Fig. 17—A more common way of framing headers over opening, which is cheaper than that shown in Fig. 16.

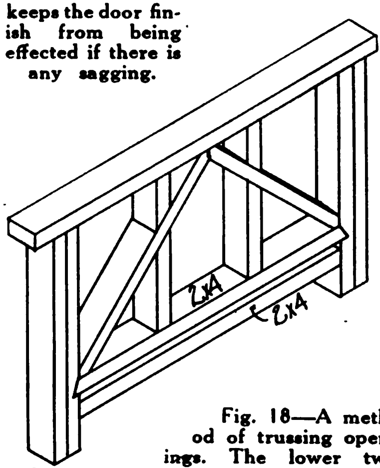


Fig. 18—A method of trussing openings. The lower two members are usually just a doubled header.

There are two ways to bridge a partition: 1, To place the pieces horizontally as shown in Fig. 1, the pieces being set alternately higher and lower; 2, diagonal bridging as shown in Fig. 12. Both methods are good, but the diagonal bridging is more effective in preventing the partition from sagging, since a continuous truss is formed across the wall.

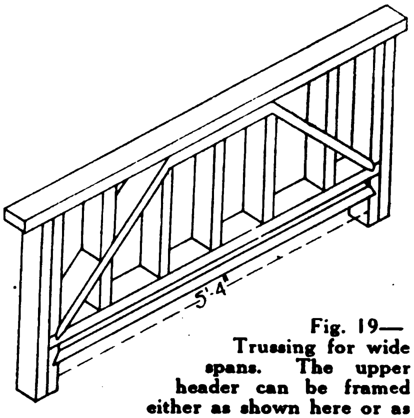


Fig. 19—Trussing for wide spans. The upper header can be framed either as shown here or as in Fig. 18. Also note the method of framing the lower header.

Where partitions intersect, the corners should be made solid. Two methods of doing this are shown in Figs. 13 and 14. That in Fig. 13 is the better practice. In Fig. 14 the stud "d" should be nailed to the bridging.

Very often it is desired to soundproof a partition between rooms or apartments. This can be done as shown in Fig. 15. The paper is attached to one set of studs only.

There is no necessity for trussing openings in partitions where the opening is under 3 ft. and no weight is borne by the cap. The cap or head should always be doubled, as should the studs at the sides.

In framing headers, it is advisable to keep the upper timber 1 in. above the lower, as shown in Fig. 15. Then if there is any sagging, the door finish nailed to the lower timber will not be affected. It is more usual practice, however, to merely lay the doubled studs as shown in Fig. 17.

All openings over 3 ft. should be trussed. Fig. 18 shows a good method generally used for narrower spans. For wide spans the construction shown in Fig. 19 is better.

Very often trouble is encountered in constructing a partition over a room of wide span, there being no means of support below. In such cases the partitions may be trussed as shown in Fig. 20, which is recommended by F. E. Kidder. If the partition is properly designed it can be used to carry bearing partitions above without sagging. Such partitions should always be slightly crowned as the truss is likely to settle as the timbers season and shrink.

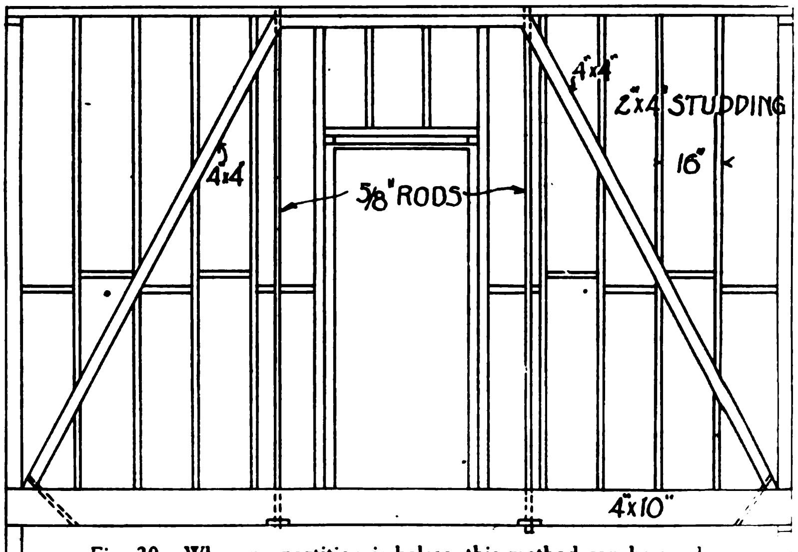


Fig. 20—When no partition is below, this method can be used to prevent sagging of second-story partition. This can be used as a bearing partition if properly constructed. It should be slightly crowned.

(The End)

War-Time Conditions in the English Building Trades

By John Y. Dunlop

Britain, one of the Quadruple Alliance, has stood ready to do its share and more, in the present struggle. The Building Trades, like other industries, has come to the fore and has done its part. However, there is a very pronounced opinion in the British building trades that the time is near at hand when this industry should not be further drained of men for military service. The building industry has already contributed more than half its workers, mainly as soldiers.

The building trade in England is on a war basis. Practically no construction is proceeding except in munition areas and other work of national importance. In other words, such of the building industry in England as is left is a "necessary industry."

While the industry is united in the "win the war" policy, much dissatisfaction is felt at the way the present machinery sorts out men for military service works.

Workers in the building trades, such as electricians, mill joiners, bricklayers, do not receive exemption, but are advised that exemption will be granted if they are employed on maintenance and repair work in other industries.

This has provided an opening for the man who wants to escape military service. Men transferred their service from their building trade employer and became employed at their trade in another industry which has a maintenance and repair department.

It is obvious to see how this had the effect of penalizing the industry. Some instances have been noted, where concerns purposely set up maintenance and repair departments to hold their workers. This condition has served to help defeat the object of the military service law.

At the present time, the industry is so depleted of workmen that there is grave danger that construction of national importance must be abandoned. When this condition exists, it should no longer be necessary for a worker to transfer his services to another industry to obtain exemption.

The building trade would like all workmen to be equally protected, if entitled to protection at all, no matter what class of employer they may be engaged by.

Another grievance which builders find against the present operation of the military service law is that employers as a class do not receive due consideration. Directing heads of building and contracting firms which are engaged in work of national importance are entitled to exemption. However, technically trained men in builders' and contractors' offices are not taken care of.

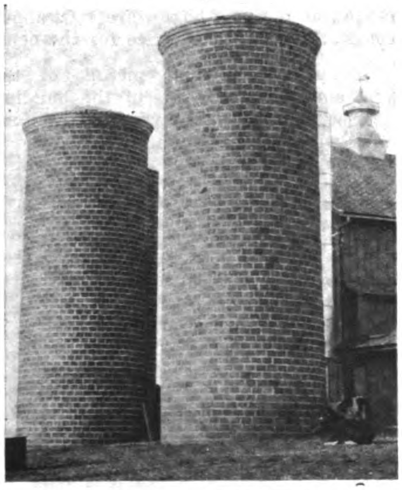
At present every builder's office staff is reduced to the minimum and very few men are left who are not within the definition of "indispensable on account of their technical knowledge."

The real need for those men after the war will be so urgent that in the national interest it is inadvisable to deplete it any further if that can be avoided.

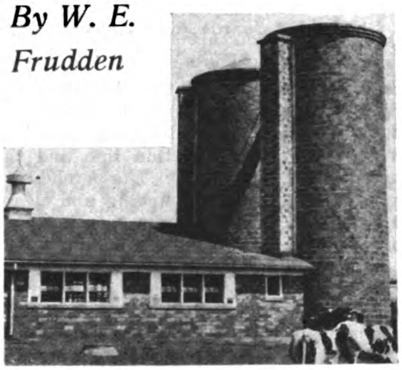
The Silo Is an Essential Building

By W. E. Frudden

The construction of a silo this fall will be considered a most patriotic duty. The Iowa National Council of Defense in a very extensive campaign among farm owners insists that Iowa must go "over the top" on silos. The silo has come as first aid to the beef supply in this war crisis, and for the dairy farm it has long been considered as important as a deep well.



A pair of twin silos that have stood the test for five years. In buildings of clay tile concrete foundations below the frost line are the first essential. Workmanship throughout the structure must be first-class. This illustration shows two silos, one for winter and one for summer feeding.

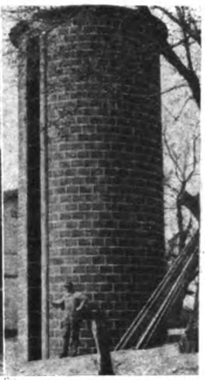


Twin silos on the new modern Iowa State College dairy farm, Ames, Iowa. Note the "fresh air inlets" or registers built in as a part of the window frames.

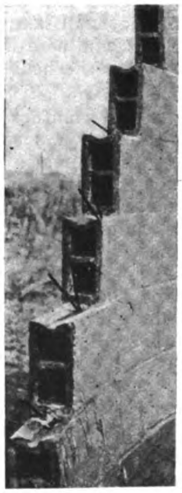
The rural contractors and builders and every building material dealer should avail themselves of this golden opportunity to be of service to the country in this matter which concerns the building industry. It's time now to launch the campaign for fall silo building for this year's bumper corn crop.

I am enclosing some good views of clay tile silos. There are numerous good silos, made of other materials, but I dare say these photos illustrate a most popular permanent structure. There isn't time now for experiments—it is a question of action. Silos, regardless of type, are a necessity, and everything possible should be done now to encourage this fact.

For the average farmer a 14'x30' silo is most popular, and most practical from the standpoint of construction if wood is used. However, if clay tile are used the height of 50' is satisfactory. Silo height is an important feature in securing well-packed ensilage.



This 12'x42' silo is well adapted to the smaller cattle feeder of the Middle West. This illustration shows the reinforced concrete door frame before the silo doors have been placed and the chute built. Door frames are often built of channel steel.



Section of clay tile silo wall showing a typical block used, also a common method of placing reinforcing steel in the motor joints. The steel is continuous and is securely connected to the silo door frame.

Window Area and Height

Authorities have stated that at least one square foot of window surface should be provided for every 100 cu. ft. of interior space to be lighted.

In order to secure better light and ventilation the top of the upper sash should be placed as high as possible.

Occasionally the meeting rails are placed above the level of an average person's eyes, the lower sash being larger than the upper. This enables one to look through the window more easily.

A Poultry House Built by a Practical Builder and Poultryman

It Is Inexpensive and Well Suited to the Welfare of the Birds

By H. H. Shepard

Note How the Sash of the Windows Are Hinged So as to Provide Plenty of Fresh Air

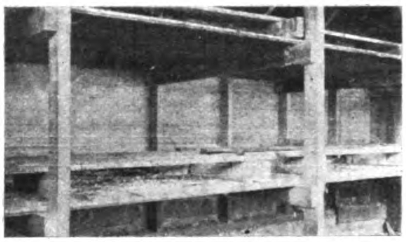
Nothing in the line of a good building is too good for chickens. For on the average farm the flock of chickens often makes nearly half the living for the farm family; that is, furnishes eggs and meat for home food, and with enough surplus to sell to buy fully half of the ordinary household essentials.

There are many objections to the old shack of a poultry house. One is that it is damp and uncomfortable for the birds; it is hard to clean and keep clean; it is unsanitary and unsafe, and it is ugly and a disgrace to the farm or town lot on which it stands. Good chickens, like all other good live stock, must be housed well to do their best. Neglect them in this matter, and they will prove a failure. Money is well spent in building a good and beautiful poultry house, one that will last, look well as long as it lasts, and be a thoroughly comfortable home for the hens of nights, winter and all bad days.

Animal comfort must be the keynote in planning and constructing any building for animals. The next important point is sanitation, and the next is convenience for the attendant in caring for the animals and the house. Working from several years' experience with poultry and different kinds of houses, I have tried to combine the above features in the poultry house shown in the photographs and drawings. It may not be perfect, or suit all, yet it has been in use for several years and has given very great satisfaction.

Our poultry house is 24 ft. long by 12 ft. wide and 8 ft. high from the foundation to the plate, and 13 ft. to the highest point of the roof. The roof slopes equally both ways, being of the best grade of shingles, which, with heavy felt, are the two best roofing materials for poultry houses.

This house is divided inside into two rooms—the first room as you enter from the west end is 12 ft. wide by 16 ft. long. In the extreme east end of the house is a brooder room 8 ft. wide by 12 ft. long. The larger room is the laying, scratching and roosting room. We always plan to keep from 70 to 100 laying hens over winter, and to accommodate that number double-decked dropping boards 4 ft. wide and perches are built-in. The lower dropping board is 2 ft. from the foundation line and the upper one 2 ft. above it. The perches are in sections for easy removing and cleaning, as well as for cleaning the dropping boards, and are made by nailing slats on 2 by 4's. The ground floor of this larger room is 6 in. below the level of the foundation wall, making the first dropping board 2½ ft. above the ground floor level. The raised dropping board thus allows full space of the floor of the room for scratching and exercise purposes in winter and on all bad days when the hens are confined in the house. Also the adjoining brooder room's full floor space is available in the fall and winter (not being used for brooding purposes in those seasons) for exercise and scratching for the laying flock. The brooder stands 18 in. clear of the floor.



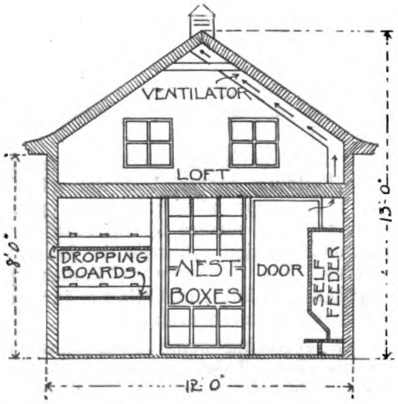
Interior of Laying Room, Showing Dropping Boards and Perches

Our dropping boards are built of the best matched yellow pine flooring, with all nail heads completely covered. Those who have had experience with dropping boards of old, rough boards know that they soon become unsanitary, are a foul breeding place for lice and mites, and are very difficult to clean. Ours are painted heavily with plenty of lead to seal the cracks and make them impervious to dirt and insects. It is easy and saves time to clean smooth dropping boards, while it is a mean, hard, unsatisfactory job to try to clean rough ones.

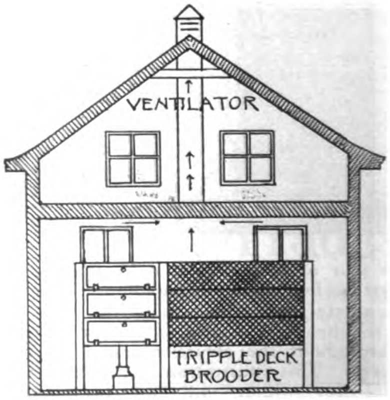
Also in the larger room are nest boxes built against the walls between the outside door and inside door and the perches. A self-feeder is built against the south wall between two windows. It, as well as the nest boxes, are 1 ft. above the floor to save floor space for the hens.

In the photographic picture of the west end and south side of the building may be seen the large window and four small windows that supply light and ventilation to the laying and scratching room. The sash of the large window

Plan of Poultry House



Section Through the Scratching Room



Section through brooder room.

slide up-and-down, while those of the smaller are hinged at the middle, the lower portions always remaining stationary, while the upper portions swing inward and are held at an angle to divert incoming currents of air upward and away from the sleeping birds. A wooden ventilator conducts the air from the top of these windows up through the room above and out at the top of the roof. Although all the windows are closed on the coldest and stormiest nights of winter, the upper sash of the four small windows are 2 in. short of their frames, hence even when all are closed some fresh air is continually flowing into the house at the top of these windows. In ordinary winter weather the windows are swung inward for abundant ventilation, as may be seen in the photograph.

The building in general is well lighted with glazed windows. There is one in the gable of the west end for the single large room above, and there are four small windows in the east end of the building, two for the brooder room below, and two for the single large room above, 11 windows in all. Sunlight is the best tonic for both young and old chickens, and the best disinfectant known. Plenty of windows in a poultry house are a good investment. They mean healthier, snappier birds, and more eggs in winter.

The east room of our poultry house contains a triple-deck brooder, 3 ft. wide by 7 ft. long and 4½ ft. high from the floor. It is built on 2 by 4 posts. Each brood chamber and run of one section is 1 ft. high, while the brood chamber is 3 ft. by 3 ft. and the run 3 ft. by 4 ft. In effect and use it is the same as three brooders superimposed upon one another, with the floor space of only one, hence its room economy. For heating this triple-deck brooder a common 3-in. galvanized rain pipe runs up through the middle of the brood chambers, extending a few inches both above and below. One good lamp heats all three chambers almost as easily as one, hence fuel economy. And, the room being tight and warm, the escaped heat from the brooder keeps the room mild in cool spring weather when the first chicks are placed in it. This room is tightly partitioned off from the laying and scratching room with communicating door. When we have many hatches coming off the oldest chicks from the brooder are placed on the floor of the brooder house, with a box in one corner for a hover. Hence during the rush season we are able to segregate four different broods of chicks of four different sizes and ages.

The ceiling of the lower rooms is also the floor of a loft room. It is of matched yellow pine flooring on 2 by 6-in. joists, reached by a narrow stairs and trapdoor from the brooder room. This loft room is used ordinarily for a general storage room for poultry supplies and fixtures. In the coldest and dampest weather the door to it remains open all the time. The floor is kept covered with a litter of clean straw, and the hens use it for an extra scratching room. The total floor space above and below gives ample room for 100 hens during the winter months.

This poultry house is built on a solid concrete foundation, with narrow inside concrete wall for dropping board post support. The joists and sills are 2 by 6, while all the remaining frame lumber is 2 by 4. The best grade of drop siding is used, painted three coats outside, red with white trim, and two coats white inside, the inside painting mainly for the purpose of sealing cracks against dirt and insects. It was built five years ago at a total cost of $250.

A Vegetable Cellar Is a Good Investment for the Gardener

By Chesla C. Sherlock

It is safe to say that most of the war gardeners in this country will keep right on raising large crops of vegetables after the war. Indeed, the indications are that they will be as sorely needed then as they are now. If that is the case, then people will want vegetable cellars, permanent structures that will last for all time and builders can help the cause by suggesting such structures whenever called upon to build a vegetable cellar or pit.

This article contains a worthwhile idea. Although the vegetable cellar described is rather too elaborate for the gardener, yet it gives several ideas as to how one can be arranged to fit the war needs of the war gardener or small farmer.

Many a gardening novice gathered a fair crop last year only to have it frozen or destroyed by rats and other pests. Such a man would especially welcome a hint as to how he could avoid a recurrence of his trouble.

Now is the time of year to give such a hint. Visit the farmers in your locality. Point out to them their needs and show what a small, inexpensive vegetable cellar would do in conserving crops. Quote price of finished cellar. A few of those you visit will surely adopt your suggestion and give you the order to go ahead.

A good vegetable cellar that I have noticed recently is constructed of stone gathered up from the bed of a creek which runs through the farm. It is twenty-five feet wide by forty feet long and is of the vault type, the walls running back some six feet on either side beyond the curve of the arch-shaped roof. The floor is also of stone and being cemented on all sides it is practically impossible for rats or mice or snakes to gain entrance and disturb the vegetables.

A Vegetable Cellar Built Partly Underground Is Frequently the Best Type

The extending walls, running as they do back under the dome, afford an excellent place to store potatoes, carrots, beets, sweet potatoes and other tubers and roots. Bins are constructed here to facilitate their handling.

On one side there are several large pits filled with sand for various vegetables that need to be packed in it in order to keep in the best fashion. The cellar is adequately ventilated by a small pipe running in at one end and out of the other. It is not damp in the end that so many of the old-fashioned caves and cellars are.

This cellar is only a few steps from the kitchen door and an arbor of grapes grows over the intervening space. There are two doors to the entrance of the cave, the outside one being of sheet iron, which is a further guarantee that no pests or rodents will get into the cellar. The inside door is more as a precaution against changing the temperature in the cellar when entering.

A permanent structure of this kind can be built to fit individual needs, varying the size of the cellar according to the amount of produce to be accommodated. It can be built at very little more expense than many of the temporary structures that are at once costly and unsightly that are being constructed at the present time. A use of it will more than warrant the decision and bring pleasure and profit to the owner.

Obtaining Angles with a Carpenter's Rule

By E. Tor

It is often necessary for a carpenter to obtain various angles on the job when he has no protractor or other aid to help him. As he nearly always has his 2-ft. pocket rule at hand, he can utilize that to obtain the required angle.

One of the convenient helps which trigonometry affords is that if an isosceles triangle is constructed with its base equal to a given distance, that the angle at the apex will bear a certain pro-

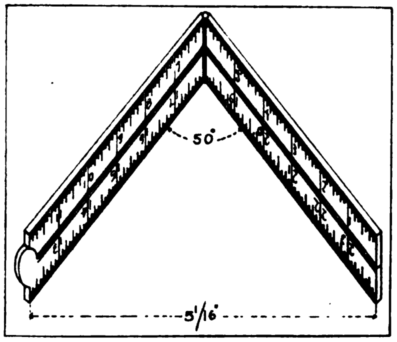
portion to this base. Or, to reverse this, the number of degrees at the apex will bear a stated relation to the base. For definition, an isosceles triangle is one with both legs equal.

Now to make use of this fact in connection with an ordinary carpenter's rule. The following table contains two columns, the first of which gives the degrees and the second column the length of the base of the isosceles triangle whose apex will form this number of degrees.

Degrees	Base Inches	Degrees	Base Inches
5	17/32	50	5 1/16
10	1 1/32	55	5 17/32
15	1 9/16	60	6
20	2 3/32	65	6 7/16
25	2 19/32	70	6 7/8
30	3 3/32	75	7 5/16
35	3 19/32	80	7 23/32
40	4 3/32	85	8 3/32
45	4 19/32	90	8 1/2

Open the rule as shown in the illustration, measure across from the top of the 6 in. mark (calculating from the main pivot) so as to get the exact length of the base at the top of the rule, this length being given in the column under "Base," and which is alongside of the number of degrees in the angle.

For instance suppose, as in the illustration, that it is desired to construct an angle of 50 deg. Looking in the table until we come to 50 deg. we find out that the base of the triangle should be 5 1/16 in.; so we measure across the top of the rule so as to make a triangle with a base of 5 1/16 in. Then the angle at the apex will be 50 deg., as shown. If it is desired to construct an angle of 75 deg. we look down the table and find opposite the 75, in the degrees column, the number 7 5/16 in the "Base" column. Constructing a triangle with this as the length of the base we have the required angle at the apex.



A Practical Method of Obtaining Angles Without a Protractor

This table, of course, only holds true when the legs of the isosceles triangle are 6 in. in length, as in the carpenter's rule which has been used for the illustration. The table also does not hold good unless the rule is of the type shown, and not one of those of the long extended types which are sometimes seen.

Some Suggestions for Carpenters in Trimming

By Owen B. Maginnis

When about to set window jambs in brick buildings, the first thing to be done is to cut out with a three-eighth chisel the little bit of wood, left in the plowing or grooves of the window frames, for the sill or foot-head and top flat soffit, then to take a sharp rabbit plane and ease off the tongues by taking a shaving of the back of each of the side jambs and soffit boards.

The three are then nailed together, similar to door jambs, set up in place and the tongues driven solidly into the grooves wrought in the inside casings of each window frame, and "toe"—or level nailed closely thereto.

It must be noted that care must be taken that they are neither too wide nor too narrow for the plastering to which the room casings of the trim should fit closely, and if either they will require to be planed off or pierced out to coincide with the plaster surfaces.

At the bottom the elbows are inserted and nailed into each panel-back with tongues into grooves as before, the three are placed in the window recess and scribed to the floor, so the top edges of the three will come exactly to the bottom side of the sill groove in the window frames in order that the foot-head or window stool may be admitted into its place.

After neatly jointing off the top edges of the panel-back and elbows or side pieces the whole may be nailed to the floor and the stool set.

When inside shutters are employed the groove on the inside casings is generally far enough back from the edge of the frame to allow ample space for the admission of the front panelled shutter and back folds, showing a ½ inch margin outside. The elbows are kept to the same face line as the shutters so that they will all show as one panelling the foot-heads or stools occurring at this joint.

The best way to scribe panel backs and elbows to floors is as follows:

As it often happens that the frame has been jarred out of square or the floor out of level by hasty or faulty workmanship, or by the settlement of any buildings, necessitating unusual skill or labor, proceed, after jointing to place the panel-back in position against the frame in the window-recess. Plumb one stile by "shimming"—or blocking up whichever side is low. Set a pair of compasses or dividers from the top edge of the sill casing to the bottom of the groove on the corner of the frame which is highest. Then draw the compasses along the floor, scratching the bottom rails for the saw-cut to fit. After scribing it will be found that the corner to which the compasses have been set will come exactly right, but the other, opposite side will need to be planed off until it comes flush with the bottom arris of the groove.

It is a good idea to furr or block out for the base or skirting before the plastering is commenced. It will save hammering off the plaster and much dirt and dust when settling up the clean and sometimes finished trim.

One of the very important and too often neglected items in setting up door-jambs, is omitting to block out solidly behind each finished jamb and wall stud or buck to receive the screws of the hinges. Panels are, in ordinary buildings, usually not over ⅞ in. thick and if of pine or soft wood the screws will never hold, especially if the door hung to them be heavy or subject to much slamming. Therefore good sound block not less than 8 or 12 in. should be inserted behind where the hinges are set generally 6 to 7 in. from the top and 10 to 12 in. from the bottom. Builders should watch sub-contractors on this detail as the screws, no matter how long, will surely work loose and pull out when they have no thickness of wood to hold to.

Should the casings have headed or molded front edges and be without corner blocks, the top corners must be mitered in a miter box or with a "miter jack" in the following manner:

Obtain a piece of 1¼ in. stock, one inch or so wider than the width of the casing, and about 24 or 30 in. long. Nail a fence piece material, 2 in. wide on both its edges, rising above the surface of the casing. Now take a bevel set exactly to a hair (not nearly) 45 degrees or a full miter which may be done by placing it on a good true steel square across 3 to 3 or 6 to 6, and screwing it tight. Reverse the bevel across the square to make sure it is correct and the angle true. Then make two opposite marks, for right and left hand cuts, across the top edges of the ⅞ in. strips, on both sides and across the board itself.

Saw neatly and accurately to a hair down through the strips and deep enough into the main piece to cut through the bead moldings of the casings or trim when it is placed between the "fences," as these strips are technically termed.

After setting and nailing each casing up in its place and temporarily marking its length with a sharp penknife or pencil, it is placed against the fence in the "Jack" the mark outside, so as to allow for the thickness of the saw-kerf, and care must be used to keep the full thickness of the blade outside each mark, otherwise the piece will be this much, about 1/32 in. or 1/16 in., too short. By this means miters can be readily sawed without having recourse to a big miter box which is clumsy and uncertain.

All casings must be so flat or level across their faces that when a straight edge is placed across them it will touch all their faces and edges, the head pipe must be on the same line with the stiles, and all the miters and joints close to invisibility as well, and securely nailed. All nails should be set at least 1/16 in. below the finished surface.

Construction Questions Answered

If you want help in any branch of building construction, just write to this Department. We will be glad to answer all your questions without charge.

Questions should be confined to construction only, as the editors cannot undertake to design any structures.

All readers are invited to discuss the questions and answers published.

Method of Renewing Blue Print Paper

From M. I. H., New York.—Will you kindly tell me if there is any known method of renewing blue print paper? At present I have a new roll that I can get no results from. I have read of using something after the exposure was made and the print wash being used to renew it, but have forgotten what it was. If you will give me any information, I will appreciate it.

Answer.—I do not know of any method of renewing blue print paper by means of applying a chemical wash after exposure. Some blue printers do use a bath composed of a small amount of bichromate of potash dissolved in water, into which the prints are placed after being immersed in a plain water bath for development. They claim that by this method better and clearer prints can be obtained. Also that the bichromate of potash bath fixes the prints so that they do not fade so readily. Perhaps this is what you have reference to. When the potash bath is used, the prints must be thoroughly washed after being taken out.

Would refer you to article on how to make blue print paper in the October issue of BUILDING AGE, from which article I am sure you will get some useful information in reference to the preparation of the original coating solutions, etc.—W. G.

What Is Portland Cement?

From B. R. G., New Mexico.—Would you accommodate me by publishing through your correspondence column exactly what Portland cement is—also why it is called "Portland"?

Answer—Portland cement is the material which has made it possible to build the greatest engineering structures of modern times, among those included being skyscrapers, seawalls, dams and bridges.

Fully 95 per cent of the Portland cement produced is artificial.

Portland cement is produced artificially by calcining or burning with a heat of sufficient intensity and duration to induce incipient vitrification, a fine ground and carefully proportioned mixture of calcareous (limey) matter and argillaceous (clayey), siliceous substance (sand, quartz or slag). After burning, the resulting clinkers are ground to a fine powder, to which in some cases it is necessary to add a small percentage of gypsum or other special ingredient to regulate setting.

The name "Portland" is derived from the resemblance which hardened mortar made of it bears to a limestone found in the Isle of Portland, off the south coast of England.

The quality of Portland cement depends upon the quality of the raw materials, their proportion in the mixture, the degree to which the mixture is burnt, the fineness to which it is ground and the constant and scientific supervision of all details of manufacture. W. G.

How to Figure Board Measure

From D. L. C., Arizona.—Referring to your reply, in your correspondence department, to C. S., New York, on "How to figure board measure" while the rule you gave is good and accurate it is not by any means quick.

A rule that I have used for years which is just as accurate and susceptible to mental work is as follows:

"Multiply the width of your stick by the thickness, then determine what fractional part of twelve this amount is. Then take this fractional part of the length of the stick which will give you your footage."

For instance to figure the footage in a 2 in. x 4 in. 2 x 4 = 8, 8 is 2/3rds of 12.

Figuring a 2 in. x 4 in.—10, 2/3rds of 10 is 6 2/3rds ft.

Figuring a 2 in. x 4 in.—12, 2/3rds of 12 is 8 ft.

Figuring a 2 in. x 4 in.—14, 2/3rds of 14 is 9 1/3rd ft.

You will find that with very little practice that almost any sized stick can be rapidly figured by this method without recourse to pencil and paper.

In figuring larger sizes such as a 8 in. x 8 in. the following will illustrate:

8 x 8 equals 64; 12 into 64 goes 5 1/3rd times, which is the number of feet in one lineal foot of the stick.

An 8 in. x 8 in.—16 would figure 5 1/3 times 16 which equals 85 1/3rd. Any size stick figures rapidly by the above with the exception of 1 x 5 or 1 x 10.

From A. R. F., New York.—In the August BUILDING AGE, A. C. of New York asks for a quick method of figuring board measure.

Your answer was all right, but you could go a little farther with the same method; or, in other words, the same process can be worked out by cancellation, putting the thickness, width and length above the line and 12 under the line. If there is more than one piece of timber, the same method will work; put the number of pieces, the thickness, width and length above the line and 12 below the line, and proceed to cancel.

One piece of 6 in. x 8 in. x 22 ft. would be:

$$\frac{\cancel{6} \times 8 \times \overset{11}{\cancel{22}}}{\underset{\cancel{2}}{\cancel{12}}} = 88 \text{ ft. B.M.}$$

27 pieces of 2 in. x 10 in. x 18 ft. would be:

$$\frac{27 \times \cancel{2} \times 10 \times \overset{3}{\cancel{18}}}{\underset{\cancel{6}}{\cancel{12}}} = 810 \text{ ft. B.M.}$$

The same method also works if the thickness is in a fraction and the length is in feet and inches.

25 pieces of 2½ in. x 10 in. x 18 ft. would be:

$$\frac{25 \times 2.5 \times \overset{5}{\cancel{10}} \times 18.667}{\underset{6}{\cancel{12}}} = \frac{5833.44}{6} = 972.24 \text{ ft. B.M.}$$

If you think the above would interest or help any of the readers of BUILDING AGE, I would be glad if you could give it space in your Correspondence Column.

Depositing Concrete Under Water

From E. A., Georgia.—Would you accommodate me by publishing through your correspondence columns how concrete can be successfully deposited under water?

Answer—To deposit concrete successfully under water an essential requisite is that the materials shall not be dropped into position any height through the water, but be deposited in a compact mass. Dropping the materials separates the cement from the other ingredients, and the work is seriously impaired. The heaviest ingredient, stone, will be deposited as a bottom layer, and the cement, the highest, as a top layer.

The slightest fall in the placing of concrete under water is to be guarded against, so as to prevent the materials being deposited in a series of layers.

The following methods are commonly and successfully employed to deposit concrete under water:

It is placed in V-shaped boxes constructed of heavy timber or sheet iron. The boxes are built with sloping sides, one of the sides being arranged to swing open. The box, after being filled with concrete, is lowered into position by means of a crane. A rope arranged to open a latch on the movable side of the box is operated from above the surface, allowing the movable side to swing open and the concrete to fall out. The box is then raised and refilled, and the operation repeated as before described.

Long boxes or tubes are sometimes used. They are built in sections, open

at the top and bottom. By building them in sections the length can be adjusted to the depth of the water.

The concrete should be poured into the top of the tube or box rapidly enough to keep it full continuously, as it must not be deposited faster from the bottom than the tube is filled.

Bags of paper and open cloth are also used. When paper bags are used they are placed by lowering them in position or sliding them down a chute. The bags soon burst, due to the wetting of the bags and the pressure of the concrete, allowing the concrete to bond together. When concrete is placed in open cloth bags, the cement oozing through the meshes forms the bond.

The placing of concrete in running water should not be attempted unless the material is bagged in paper or cloth bags, as the cement will be certainly washed out.

W. G.

How Can Size of Door Butts Be Found?

From A. L., Vermont.—I am not a carpenter, but tinker around a little. Want to hang some doors in the near future, but am at a loss as to what size butts to use. Is there some rule used for determining the size required?

Answer—The rule for finding the width of butts required for any door is as follows:

Rule.—To twice the thickness of the door, less ½ in., add the full projection or architrave or plinth block key beyond the face of the door.

Example.—Let us assume we have a 1¾-in. door to hang, the architrave projecting 1½ in., there being no plinth. What width butt should be used?

The width of the butts would be 1¾ in. + 1¾ in. — ½ in. + 1½ in. = 4½ in., which would be the proper width butt to use.

Two butts are usually used on a door, but when the door is over 2 ft. 8 in. wide or more than 7 ft. in height three butts should be used.

When two butts are used, it is usual to keep the lower end of the lower butt in line with the upper edge of lower rail, while the top end of the upper butt is kept in line with the bottom of the upper rail. Where three butts are used it is well to keep the top of the intermediate butt on a line with the upper edge of lock rail, as by so doing they line up with the rail; if they were centered the appearance would not be symmetrical.

W. G.

How to Find the Minor and Major Axis of a Face Mold with Unequal Tangents

From F. S. S., Long Island, N. Y.—Enclosed you will find sketch of stairs for which recently I had a rail wreath to make, which was a difficult job as my stairbuilding knowledge is very limited, but the Morris Williams Stair Building Guide helped me out fine except when it came to laying out the face mold.

The thing that troubled me was how to find the center or should say the minor or major axis for unequal tangents. I would like you to refer this to Morris Williams as his system seems to be the simplest. I have three or four other hand rail books but they all are Greek to me.

Answer—I am very much pleased at having the opportunity to help your correspondent over the difficulty encountered by him with his face mold problem, and while helping him, I hope that my effort will be helpful to many others interested in the apparently intricate science of handrailing.

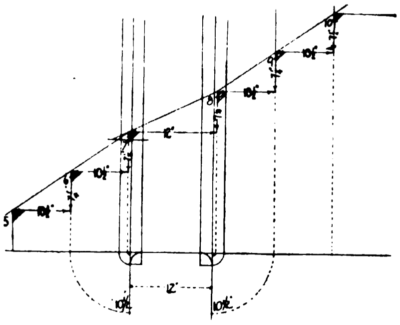


Fig. 1

I say apparently for the reason that I am positive in my own opinion if stairbuilders generally were to go about the study of the science in the way all other sciences are studied, by first thoroughly mastering the solutions of the fundamental principles, that the present character of complexity and intricacy applied to it would be abolished for all times.

These principles were first enunciated by Peter Nicholson in the year 1792. Many systems and methods to construct handrails have been published since his time in this and other countries, but the truth about all of these other systems is, that they are all without exception indebted to Mr. Nicholson for their fundamental principles. Thomas Treadgold, one of the most celebrated authors on architecture and building construction in general, says, "Mr. Nicholson was the first to publish a method of squaring the wreath upon geometrical principles." They consist in a geometrical solution to find a curve upon an oblique plane section cut through a semi-cylinder that would stand over and above its plan curve by means of beveled ordinates and also by a method of finding the axis of an ellipse curve that would stand over and above a circular plan curve by the use of a stair-builder's trammel or by the use of pins and strings.

This solution is the very thing that the correspondent should thoroughly understand because it is precisely the answer to his query, as will be seen after perusal of the accompanying figures.

Fig. 1 represents the elevation of the steps and pitch of the rail over the quadrant curves shown in the correspondent's sketch.

The tangents are shown to be inclined at different pitch, the bottom one being steeper than the top over both quadrants.

In Fig. 2 is shown how to find the center of the axis in a case of equal tangents and in Figs. 3, 4 and 5, the same solution will be applied in cases where the tangents are unequal, specifically bearing upon the correspondent's difficulty.

Proceed in Fig. 2 by drawing the pitch of the tangents as shown from C through B″ and continue to A′. Parallel to this line draw the line B′ O′ and the line O′ B″ across. From O′ and B′ draw the dotted lines shown square to the pitch of the top tangent. From B′ on the plan draw the diagonal line B′ O marked ordinate.

Place the length of the plan ordinate B′ O in the compasses, fix one of its points in B″ and turn around to cut the dotted line drawn from O′ in O″ and connect O″ B″ marked ordinate.

The line O″ B″ except being an ordinate is also the minor axis and by drawing a line through O″ square to the minor, we find the major axis as shown.

The point O″ will be the center of the axis meeting precisely the main point in the correspondent's query.

To find the point X upon the section ordinate measure from O″ to X a distance equal to O X, shown on the plan ordinate. The point X, as shown on the plan ordinate O B′, is upon the plan rail and therefore will be upon the center line of the face mold development.

By this process, any number of points upon the face mold center of rail development may be ascertained.

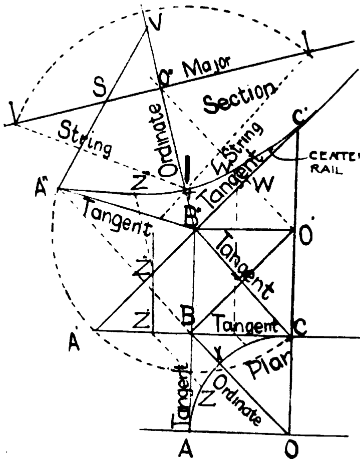


Fig. 2

For instance: Take point Z upon the plan rail; draw an ordinate parallel to O B′, as shown to Z′, erect the line Z′Z″ cutting the pitch line of the tangents.

From this point, draw a section ordinate parallel to B″ O″, as shown from Z″ to Z″′, the length of Z″ Z″′ to be equal to its plan ordinate Z Z′. By tracing a line through the point Z″′ X W from A″ to C′, the development of the center line of the handrail is accomplished.

The process here described is known as the ordinate method of handrailing and is looked upon as the most simple method of operation. To draw the cen-

ter line of rail with the trammel or pins and strings, it will be required to find the exact length of both the minor and major axis. The length of the minor is already found as shown from O″ to X. Now place this length in the compasses, fix one of its points in A′ and turn around to cut the major in S and draw a line from A″ through S to V, which will be the exact length of the major axis.

To find upon the major whereon to fix the pins for the string place in the compasses the length of the major A″ V; fix one of its points in X upon the minor and turn around to cut the major where the pins are shown.

Now fasten a string to the pins and around another at X upon the minor.

Take off the one at X and in its stead place the pencil and sweep the curve all the way from A″ to C.

In Fig. 3 is shown the same operation with unequal tangents, the bottom one as in the correspondent's problem being steeper than the top.

To find the center of the minor and major in this case proceed as described for Fig. 2 to draw the line B O′ parallel to pitch of the top tangent, then the dotted lines from B and O′ square to the top tangent. From O′ draw a line across to W, drop a line to M and connect M O. Place in the compasses the length of M O, fix one of its points in W, turn around to cut the dotted line from O′ in O″ and connect O″ W, which will be the minor axis. The major will be a line drawn through O″ at right angle to the minor. Point O″ will be the center of the axis, and as shown it has been found by precisely the same operation as in Fig. 2, where the tangents are shown to be equally inclined.

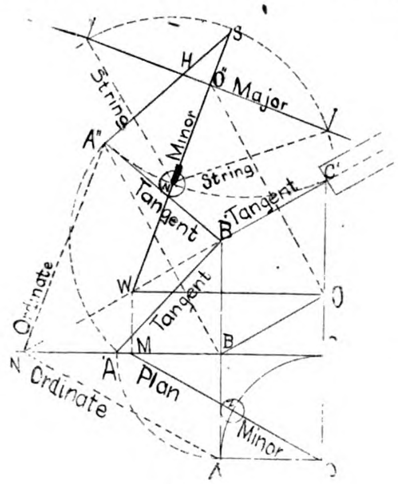


Fig. 3

Fig. 4 is another case of unequal tangents different from Fig. 3 in having a steeper pitch to the top than to the bottom tangent. It will be observed that the process of operation is precisely the same. I will here reiterate the process for a few of the most important lines having a greater bearing on the center of the minor and major axis, just what the correspondent needs mostly to know.

Draw the line B O′ parallel to the top tangent and the dotted lines from B and O′ square to the top tangent.

From O′ draw a line across to W, drop a line from W to M and connect M O. Place the length of M O in the compasses, fix one of its points in W, turn around to cut the dotted line from O′ in O″ and connect O″ W, which will be the minor axis.

Draw the major through O″ at right angle to the minor.

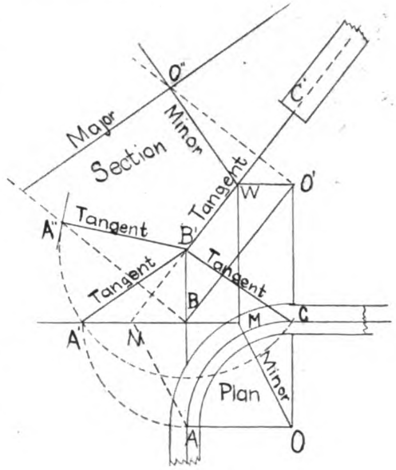


Fig. 4

The point O″, therefore, will be the center the correspondent wanted to know how to find when the pitch of the tangents were unequally inclined.

In Fig. 5, I am using the same operation with additional lines to complete the face mold and finding the spring bevels to twist the wreath. The lines relating to the development of the minor and major axis in this figure will be found to correspond with those lines used in all the preceding figures and as the reference letters also correspond this part of the problem may be here omitted.

Regarding the spring bevels, which is considered to be the hardest problem to be mastered, the operation shown in this figure undoubtedly exemplifies the most simple.

Because the tangents have different pitch, they call for two different bevels.

To find them, replace the bottom tangent as shown from B′ to C.

Now fix the compasses in O′, open it out to touch both the tangents as shown by the arcs.

Make the base of the bevels equal the radius of the plan center of the rail, as shown. The figures 1, 2, 3, and 4, 5, 6, upon the long edge of the bevels indicate the widths of the face mold at the ends the bevels are to be applied.

To draw the face mold, make the width of it at the end A″ equal 1, 2, 3, shown upon the bevel and at the end C′ equal 4, 5, 6. Its width shown at Z upon the minor axis will in all cases be equal to the plain rail. To find the points upon the major to fix the pins to hold the strings for both the inside and outside curves of the mold, proceed as was shown in Fig. 3 to find them for the center line of the rail.

Place in the compasses the length of the minor axis for the inside curve, which is shown to be the distance from the center O″ to the inside circumference of the circle upon the minor; fix one of its points in 3 and turn around to cut the major in H and draw a line from 3 through H to S as shown.

Now place the length of the line 3 H S in the compasses, fix one of its points on the minor where the pencil is shown and turn around to cut the major, as shown by the arc R, fix the pins as shown at these points and the string to the pins, as explained in Fig. 3 and sweep the inside curve of the mold all the way from 3 to 6, as shown. Repeat the operation for the outside curve, taking for the length of the minor the distance from the center O″ to the outside of the circle and for the length of the major the distance shown from I through D to E.

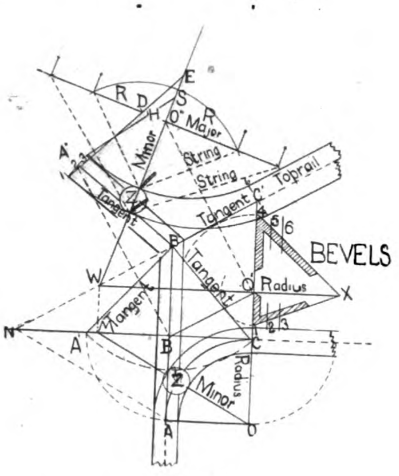


Fig. 5

The point D on the major has been found by the same operation as for the point H by placing the length of the minor axis in the compasses and fixing one of its points in I and turning around to cut the major in D and drawing the line from I through D extended to E.

Morris Williams.

Corrections in "Concrete Walls for Shallow Reservoirs"

In the answer, "Concrete Walls for Shallow Reservoirs" in the Correspondence Department for October, the line just above Fig. 1 should have read, "the section multiplied by half the *height*." In the second column the fourth line should have read "— $M_T = 500 \times 5.33 =$ 2665 ft.-lb." In the same column (second) line 19 from the bottom of the page should have read "of the concrete on earth as *0.5* we." Also in column three the equation just under Fig. 2 should have read "— $M_H = P \times \frac{H}{3}$."

It would be advisable for you to mark these corrections on your copy, for this article is a valuable one and well worth keeping for reference purposes.

A Beautiful Three-Room Colonial Bungalow

Simple in design yet remarkably effective.

The small type of bungalow so popular to-day depends almost wholly for its beauty upon skill in the proportioning of the design. Ostentatiousness should be banned; simplicity and plainness must prevail.

The bungalow that forms the subject of this article is exceptionally fortunate in its simple appeal.

Upon approaching, perhaps the most unusual feature that strikes one is the exceptionally heavy shadow cast by the clapboards. This effect is gained by the placing of a cyma reversa, or reversed ogee molding, under the lower end of each clapboard. This molding gives a body to the shadows that is indeed charming.

The small porch is typically colonial. The slender columns are simply paneled, the caps being devoid of ostentatious ornamentation. Pilasters, or half columns, finish against the house wall, lending the appearance of supporting that part of the roof to the advantage of apparent stability.

The shutters are of the familiar crescent-shaped saw-cut type so often seen, with battens top and bottom. These shutters are painted green, as is the shingled roof.

The manner in which the clapboards are finished at the corners of the house is individual and somewhat out of the ordinary. It is these little touches, inside and out, which make this particular bungalow charming, for otherwise its too great plainness might soon cause a loss of interest to the frequent passerby. The exterior window trim, the manner in which the roof returns back to the house wall, the cornice molding—these are all interesting and effective.

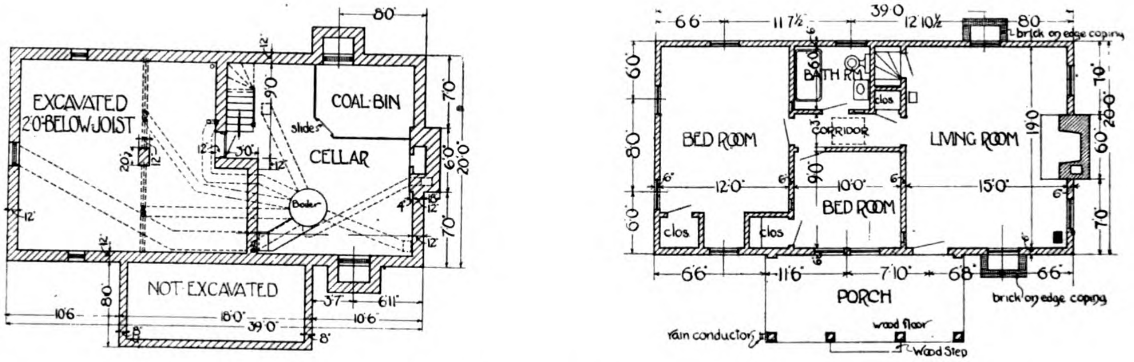
The roof is provided with gutters only on the flat deck over the porch. The conductor here is placed at the side of the porch column, which is on the opposite side to the usual approach, and so is inconspicuous.

Entrance is had directly into the living room, which is the usual custom in small houses so as to avoid waste space necessitated by an entrance hall.

Astonishing, perhaps, is the total absence of a kitchen. This is accounted for by the bungalow being on the grounds of a country club, meals being served at the clubhouse. A kitchen could, however, easily be added at the rear of the house. In fact, this is at present being done.

The two bedrooms and bathroom are well separated from the living room. Closet space is ample.

Economy in excavation was effected by making a cellar under part of the bungalow only, the rest being excavated to a depth of two feet below joints. The object of the latter was to afford ventilation for the joints and to protect them from dry rot.

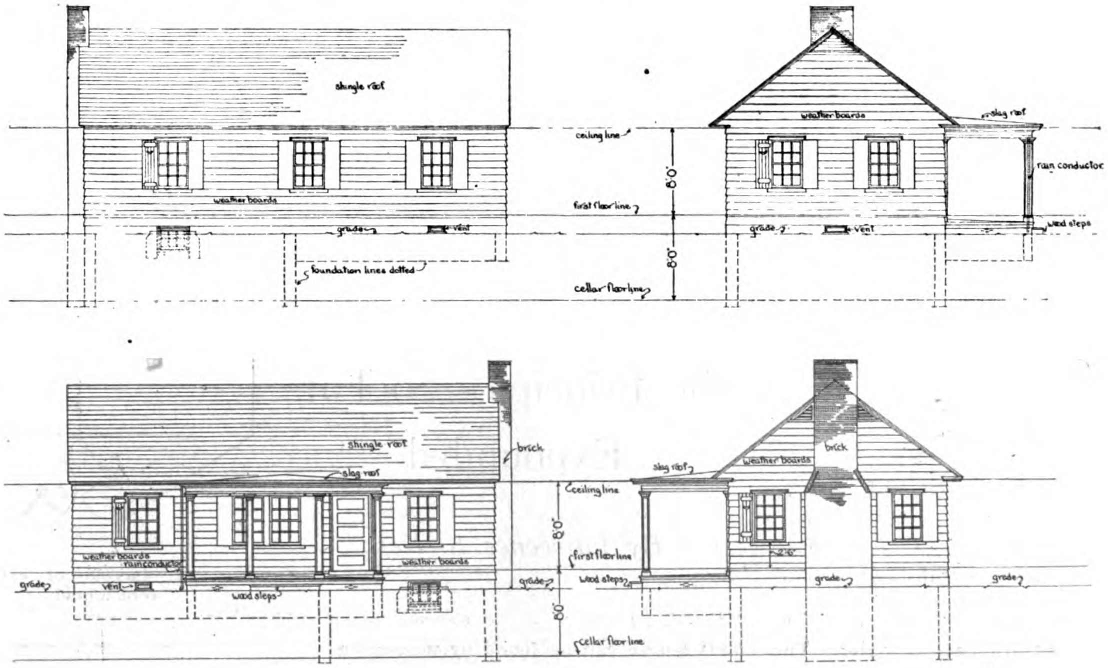


Basement and first floor plan, scale 1/16" = 1 ft. The first floor plan is unusual in that there is no kitchen, the bungalow having been built as an adjunct to a clubhouse. A kitchen, however, is at present being added.

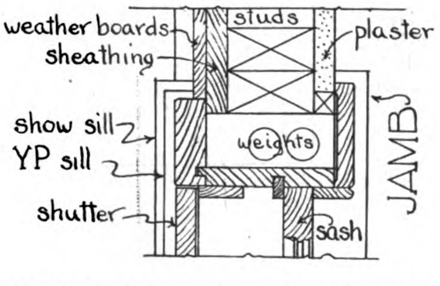
The rear of the house is plain.

Supplement to Building Age, November, 1918

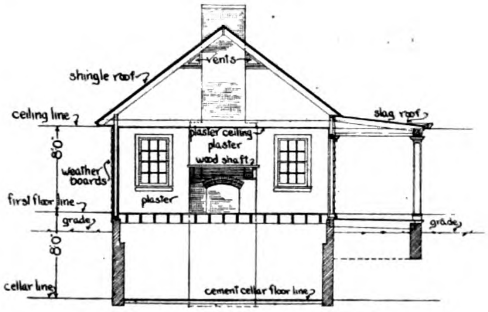
Bungalow at Pine Valley, N. J. Charles Barton Keen, Architect



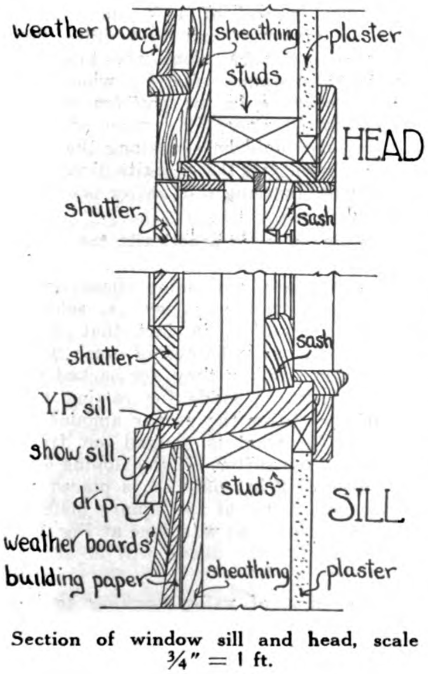
Elevations, scale 1/16" = 1 ft.



Detail of window casing, scale ¾" = 1 ft.



Cross section of bungalow, scale 1/16" = 1 ft.



Section of window sill and head, scale ¾" = 1 ft.

The bungalow is heated by warm air. The attic can be reached through a trap door in the hall ceiling, and is ventilated by louvre ventilators at each end.

This bungalow is located at Pine Valley, New Jersey, and was built for the Pine Valley Golf Club in accordance with plans and specifications prepared by Charles Barton Keen, architect, 1218 Chestnut Street, Philadelphia, Pa.

Housing Conditions in England

So great is the need for new housing in England that housing plans to be put into execution after the war cannot be much further postponed.

The longer the war continues the worse becomes the housing conditions. In spite, therefore, of the obvious objections to building under war conditions, it is quite possible that the time may arrive when a start will have to be made, irrespective of whether peace has been brought about or not.

A very bad state of affairs in some of the eastern districts of London has been revealed by the report of the committee appointed by the Garden Cities and Town Planning Association. The committee expresses itself as deeply impressed with the crowding together of houses and factories in the narrow streets and with the high rate of infant mortality. In the three parishes of Stepney, Poplar and West Ham, with a population of 731,276 it is estimated that 167,911 persons are living under conditions of overcrowding.

The committee adds that the housing question is likely to be a determining factor in the dock system; that additional housing accommodation is a matter of the utmost urgency; and that its consideration cannot be indefinitely delayed. Finally, definite proposals are submitted for the erection of 12,000 additional houses at once. This instance is only one among many, and if the war continues much longer England will have to imitate the example of Germany in East Prussia, and tackle this problem under war conditions.—London *Timber Trades Journal.*

Practical Methods and Details of Roof Framing—III

Laying Out Jack Rafters —Summing Up of the Principles So Far Expounded

By Lawrence S. Kerr

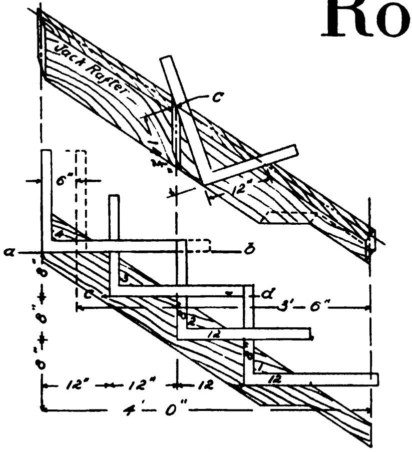


Fig. 20—Obtaining lengths and cuts of jack rafters.

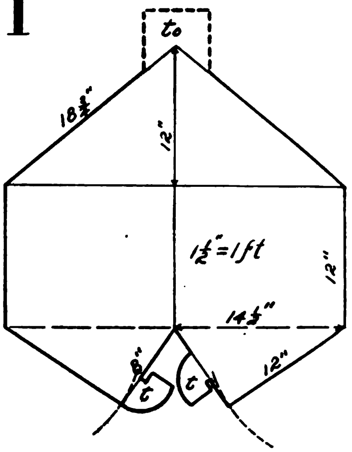


Fig. 22—Layout of extension to roof model.

Jack rafters are next in order. The plan at Fig. 13 shows the first or shortest jack to be 2 ft. from the corner. The amount of run of the jacks is equal to the distance they are from the corner and of course the rise per foot of run is the same as on the common rafters.

Using 12 on the blade and 8 on the tongue as was done for the common rafters, lay the square along the timber twice and it gives the length of the first jack. The cheek cut which is necessary in order to have the jack fit neatly against the hip is found by taking the length of common rafter per foot of run (this length can be found by measuring across the square from 8 to 12) which is very close to 14½ in. on the blade and 12 in. or run of common rafter on the tongue. The blade gives the bevel for marking across the back of the jack. This is shown clearly at c on the rafter projected above Fig. 20. Next jack is 4 ft. from the corner so apply the square 4 times and mark the same way as was done with the short jack. Run and length cut on length gives cheek cut and run and rise cut on rise gives the plumb cut.

If for any reason it had been necessary to place the second jack 3 ft. 6 in. from the corner instead of 4 ft. the length could be readily found by sliding the fourth square back along the line a,b Fig. 20, a distance of 6 in. when the square would be in the position shown by the dotted lines. If preferred, the third square could be slid along the line c,d for 6 in. in just the opposite direction. In this way any length of rafter is easily obtained.

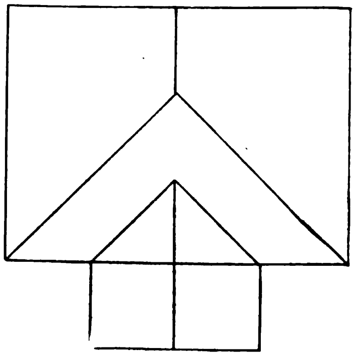


Fig. 23—Half of roof plan of model.

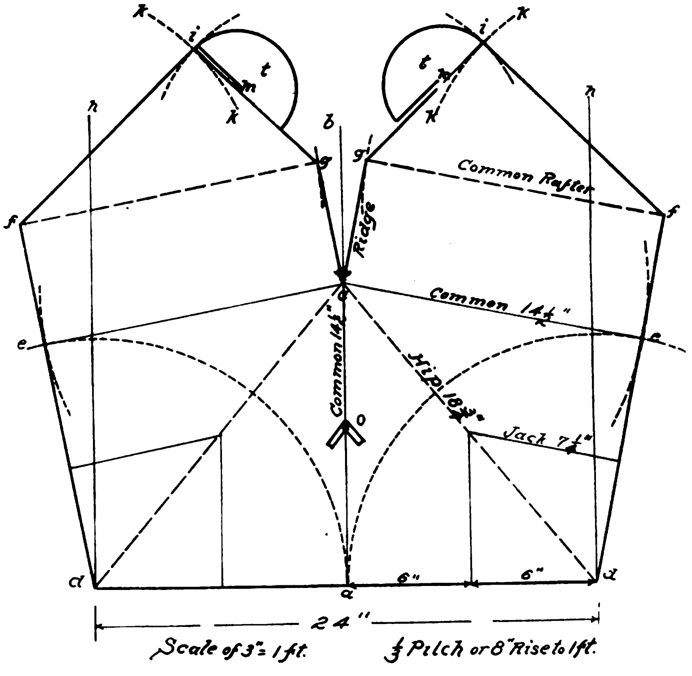


Fig. 21—Layout of cardboard model of a roof, which can be made to illustrate all principles so far expounded.

A valley rafter is practically the same as a hip rafter, same length, same cuts top and bottom, and same cheek cuts. However, a valley rafter is seldom backed. So seldom in fact that it is hardly worth while bothering much with at this time. When they are backed allowance must be made for raising the foot of the rafter the proper amount to make up for what is gauged out from the back of the rafter. If the sloping end of a piece of 2 in. material is placed at the internal angle of the square instead of at the external as was done at Fig. 16, the reason for the above will be made clear.

The amount of valley backing to be removed can readily be found by using

the internal angle instead of the external angle of the square on the foot of the rafter. Just opposite to the way it was used in Fig. 17.

In order that the beginner may make himself more familiar with all that has been gone over, a very interesting experiment can be tried by making a cardboard model of a roof. The layout of such a model is shown at Fig. 21. A convenient size for this model is the scale of 3 in. = 1 ft.

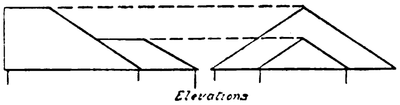


Fig. 24—Elevations of roof.

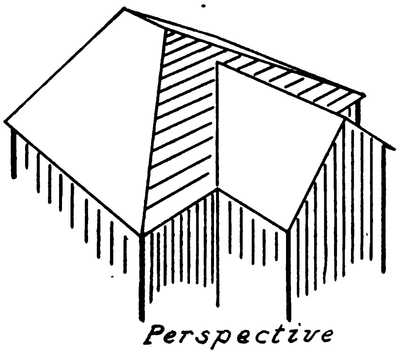


Fig. 25—Perspective of finished model

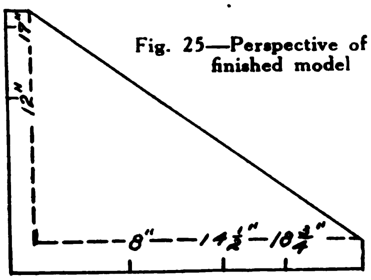


Fig. 26—Cardboard model of steel square, which can be applied to model so that the underlying principles may be thoroughly understood.

On a sheet of tough cardboard draw a line from d to d a distance by scale of 2 ft. or 24 in. At right angles to d,d, draw the lines d,h to any convenient length. Midway between d and d draw the center line of the building a,b. With d as a center and d,a as a radius, draw the arcs a,e extending them slightly beyond a quarter circle.

Along the line a,b and at a distance from a of 14½ in. mark the point c. The line a,c represents the common rafter at the end of the roof. The length of a common rafter with 12 in. run and 8 in. rise is 14½ in.

From the point c draw the lines c,d representing the hips. They will be 18¾ in. long or the length of a hip rafter having 8 in. rise to 17 in. run.

With c as a center and with a radius equal to the length of a common rafter or 14½ in. draw arcs cutting the arcs a,e, at e. Connect the points e where the arcs intersect, by lines drawn from e to c. These lines represent the first pair of common rafters on the sides of the roof. Draw the lines d,e,f marking the point f a distance of 6 in. beyond the point e. From c draw lines c,g 6 in. in length and at right angles to c,e. Connect the points g,f and we have the lines representing the second pair of common rafters.

With the points f as centers and with a radius of 12 in. or the run of a common rafter, draw the arcs k, k. With g and g as centers and a radius of 8 in. or the rise of a common rafter to one foot of run, draw arcs cutting k,k at i.

Midway between a,d and d,e and at right angles to them, draw the jack rafters which will be 7¼ in. long or one half the length of a common rafter. The half circles t and t can be drawn any convenient size and notches the thickness of the cardboard on which the model is drawn should be cut at m and m. When the model is folded into place these tabs hook together and hold it in place.

Having finished the layout of the model use a sharp pen knife and cut half way through the cardboard along the lines d,c and f,g and all the way through along the heavy lines. Turn back the angles f,i,g, raise up along the hip lines d,c, hook the tabs t and t together and the roof is in shape.

Fig. 22 is the layout of a small extension to the roof model. This smaller model is drawn on a scale of 1½ in. = 1 ft. or just half that of Fig. 21. As all dimensions are given, there should be no difficulty with this model. The tabs t,t holds the model together when folded into shape. Tab t,o fits into the angle o on the larger model. The point x of the cut out angle is half way between a and a and the sides of the angle are parallel to the hips d,c.

Cut the small model half way through on the broken lines and all the way through on the heavy lines, fold into shape and fit against the main roof.

Fig. 26 is a cardboard model of a steel square. Draw the square very accurately to scale of 1½ in. = 1 ft. and mark off the dimensions shown on it. By applying this cardboard square to the model just made, it will be easy to understand just why the different figures give the cuts and lengths required. In applying the square across the hips for the cheek cut, be sure to hold the square so that it will be in the position that would occur if the hip rafter were flat on the back as would be the case in actual practice and not flat against the roof.

If the model is turned upside down it will be seen that a hip and valley are practically the same thing.

Fig. 23 is a half size plan of the roof just finished and Fig. 25 shows a perspective view of the same roof.

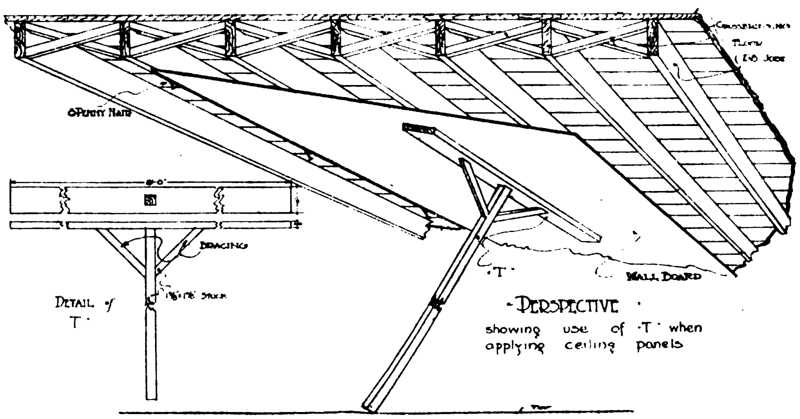
Part IV will appear in the January issue

A Wallboard Kink that Speeds Up Ceiling Work

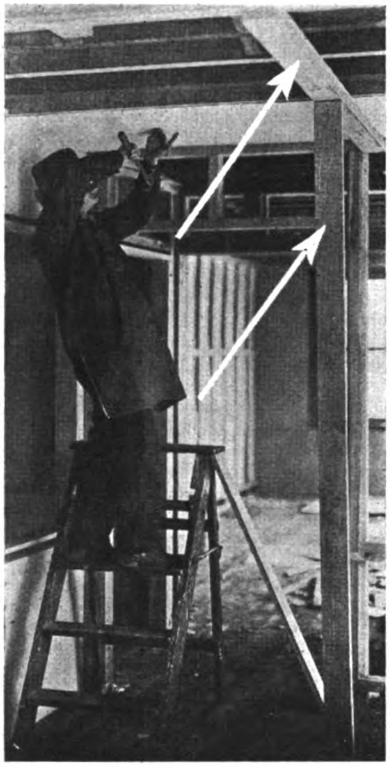
By L. H. Harvey

When the carpenter is handling a wallboard job alone he may have some difficulty putting up the ceiling panels. The "kink" illustrated by the accompanying figures and photograph, however, is a simple plan which enables the carpenter to nail the board to a large ceiling single handed and make good speed at the work without finding it a tiresome task.

As is illustrated by the figures, a "T" is made out of whatever lumber happens to be available. This "T" is built with the upright or long end about an inch longer than the total height from the floor to the ceiling. Two or three nails are then driven in one of the joists where the end of the panel will be placed. It will be observed that these nails are



When raising wallboard panels, a "T" can be used as shown. Nails are driven into the joist slantingly, the wallboard panel shoved against them, the "T" raised and driven into place. This holds the panel firmly while being nailed.



A carpenter speeding up wallboard work by the method explained in this article. The white arrows point to the "T."

driven at an angle, not straight, so that the nails will serve to catch the panel as it is being shoved against them.

After placing the panel against the nails the "T" is used to raise the board until it lies up against the joists. A kick or shove against the bottom of the "T" will spring it into position, where it holds the board securely in place. A temporary nail can then be driven part way into each of the four corners of the board to help hold the board in place; the angle nails which were driven into the joist to help raise the panel can then be removed.

With the board held in place by the temporary four nails and the "T," the center nailing should be done before nailing the panel edges. The center or intermediate nailing of course, is according to regulation wallboard custom. That is, 3 penny finishing nails are driven along the intermediate joists about 12 inches apart taking care that the heads are driven just flush with the surface of the board.

After the center nailing is complete the "T" and the four temporary nails are pulled out, as the center nailing will have flattened the board against the joists which, of course, causes it to expand or spread out a little more that it was when held by the temporary four nails. The panel edges are then nailed with the usual 3 penny common flat head wire nails, placed about every 6 inches apart and about ⅜ of an inch from the edge of the board.

Rigging up a suitable "T" doesn't take many minutes and this time is more than made up as the ceiling panels are applied and this method, of course, is much easier for the man who is handling a ceiling job alone.

Planning for More Business

Your Prospect's Wife Is an Important Factor in Closing Sales

By R. F. Duysters

Everywhere you turn nowadays you are made aware of the fact that women are working in the lumber industry and the steel industry and nearly every other industry imaginable and we see so many pictures of girls in overalls that we are liable to forget the good old fashioned housewife who is busy from morning to night keeping her house in order and her family content. Not that we would belittle the patriotic motives that have led women into industrial fields but let us not forget those women who are doing their bit and more, right at home.

Think what home is going to mean to those men who are fighting on the battle field in France to-day. That name takes on a never thought of significance to them now and the women who are keeping the home fires burning are looming large in their dreams.

Upon the kind of home life the American youth enjoys depends the future of the nation. Homes are hardly homes without the deft touch and subtle presence and influence of the female sex. Enter the houses of your neighbors or friends and a hundred things will stand out and show the hand of woman.

In the selection of a house the woman probably has more influence and takes greater interest than in the purchase of any other article. It is the woman who occupies it most, who works in every room, who is interested in the arrangement of the room, the nearness of the dining room and the kitchen and labor and time saving devices in the kitchen. Brave indeed is the man who sallies forth to buy or rent a house without taking friend wife along. Hubby is interested in the financial end of the proposition but it is the wife who o k's or vetoes the final selection.

Direct by mail literature such as letters and circulars are too often written to the man of the house, whereas a proper presentation of your plans to his wife might have a much greater effect.

In personal calls a talk with the woman of the house is always desirable. If your plans and suggestions include ideas for reducing the number of steps a woman has to take, if you can talk about plenty of closet room and such matters, you're on the road to closing the sale. A contractor even went so far as to figure out a play spot on the porch for the baby, properly fenced in, and other details which appealed to the woman at once.

Ultimately, it is the woman who makes the most use of a home. Upon her and her management depend the much talked of "Domestic Efficiency." Consideration of her and of her comfort will often build business where the husband might remain unconvinced of any real need for improvement. Get the woman's point of view and cater to her a bit.

Is Business Dull?

If you are not doing much these days this is the time to prepare for after-the-war business. When conditions do change they will change suddenly and building will start with a bang. Then it will be a case of business to the man who is ready. Reports show that the country is over 600,000 houses short right now. This is your opportunity to look over the situation in your locality and make plans for future business. An analysis of the growth of the residential section of your town will aid you and a study of real estate conditions will also be of assistance.

Remember in drawing up plans that it is next to impossible for a woman to visualize a home by merely being shown some blue prints. Draw up some perspectives if possible with emphasis on the special points that you want to call to her attention or show actual photographs of houses of a similar type. When you have this material all ready with all your facts and arguments you are ready to plan your campaign to sell it. Most builders use direct by mail methods and newspapers, while some progressive contractors get out and call personally on their prospects.

In your letters and circulars do not forget to make a good strong appeal to the woman of the house. Make your literature to her artistic—use good paper stock and colored inks. Show her how things will be arranged inside. Tell her about the heating plant and make her understand that the heating plant, the hot water arrangement, and other similar things will all be installed in the house that you build in such a simple manner that she will be able to understand all their workings without trouble and keep her family comfortable. Explain about

the location of the wash tubs, even though you may not expect her to do her own washing. Perhaps you have made an opening in the partition between dining room and kitchen where dishes can be passed through if desired. If so, play it up. It's hard to grasp floor plans and front elevations and dots for windows from plans, but when you talk about the little things just mentioned you're saying something which is easily grasped by a woman.

One dealer we know has built himself a house with all sorts of unique advantages and it is really the show place of the town. He cannot only talk about these points but can bring people around for a visible demonstration.

The same applies if you're building houses for speculative purposes. Advertise to the women and play up the conveniences in the houses and make many of your selling appeals to them. Another time you can advertise to the men and explain the advantage of owning a house over paying rent and other financial and money saving details which will appeal to the man who pays the bills.

If possible, prepare sketches or secure photographs showing how things are going to look after being built. The average person will then be better able to visualize the idea. The fact that you have done similar work for neighbors will do much to win confidence.

Nor does this suggestion to cultivate the women apply to new building only. While things are quiet you can get many small jobs and much repair work which will be worth while; for instance a call on the farmer's wife with a suggestion that you build a suitable drying apparatus in the rear yard for drying clothes, which will probably meet with favor. In some instances where houses are built close together and privacy is wanted for this purpose a trestle work can be built and later vines trained to cover it.

The woman is the vital factor in these matters, as builders of experience have learned. If you are successful in selling her your ideas the battle is half won and later you will have little difficulty in closing the deal with the man of the house. When he has your arguments combined with those of his wife to meet, he is pretty sure to capituate.

An Eye for Business

The progressive retail merchant doesn't overlook a single opportunity to increase and develop his business. In too many cases the builder and contractor is a skilled artisan taking pride in his work and overlooking salesmanship, which latter is of course important. Time was, perhaps, when builders could sit back and wait for business to come to them. Conditions have changed, however, and there is hardly a business that hasn't been touched by that magic word, Efficiency. Competition has become keener and methods that applied 50 years ago are not good enough for now.

For instance, your daily paper probably chronicles the engagements and marriages of the people in your locality. It would undoubtedly pay you to prepare a letter to go to these people, in which illustrations of a cozy little home built for two would be displayed and a discussion of the advantages of owning your own home, etc., would bring results.

In repair as well as in new work, the woman's viewpoint should be consulted and appreciated. Find out just what woman wants in a home, then give it to her.

Few builders take the same pains or make the effort to promote business that retail merchants do, yet they expect business to come their way. That advertising pays is no longer questioned. Your local paper is an excellent medium and you have an excellent opportunity to gain some good publicity through advertising in an interesting and attractive manner therein. Your copy should be changed often and made seasonable.

With the winter coming on talk about the advantages of being warm and comfortable. In the summer talk about the cool porches, etc. In the canning season talk about ample shelf room in the cellar. Hundreds of other seasonable points will suggest themselves to you if you think about the matter.

Get the Woman's Point of View

It will pay you to investigate a bit and find out just what some women want in the way of a home. Almost every woman has seen at one time or another just the ideal home that she some day hopes to own. A talk with your neighbors, your wife, mother, etc., will bring out many points which you might ordinarily have overlooked. For instance, try to gage in some way the number of steps a woman takes in a day just going about the house. It will run into miles; that's why she will appreciate ideas which have in mind economy of time, labor and effort.

Builders do not generally take nearly as much pains as retail merchants do to boom business. Advertising pays, and the man who wants more business badly enough to go out after it will certainly succeed.

Women therefore should not be overlooked by those builders who are building for success. It will pay to address your sales efforts to the women of the house as well as the men. Contractors will find the colored illustrations and photographs in building papers such as BUILDING AGE and others, worth preserving for use in personal solicitation.

Some of the important helps that the December *Building Age* will give you. Watch for them!

"How Wall Board Was Used in Remodeling an Old House" shows you ten pictures of rooms which were remodeled with wall board. The house was an old one, just an average type, but the builder made it modern and up to date inside. Read how he did it. See pages 552-554.

Speed up the setting of Door Grounds by a time saving method described on page 555.

Priming and painting bass, yellow pine, western pine, cypress, redwood, poplar, spruce, etc., is explained by a well-known painting authority. If you are interested in getting the best results from your painting work, watch for this article on page 556.

Planning the house so as to secure efficiency in room arrangement is the subject of an article based on personal investigations made for a large state university by the author. This is a valuable article for the man who is interested in getting the most into his plans. See page 557.

A chicken coop can be added to a private garage. An article describing how this has been done will be found on page 558.

The bank barn is a cheap form of construction, but is often poorly laid out. How to build one to prevent dampness is described on page 559.

If an employer's superintendent promises recompense to an injured workman, is it dangerous for the workman to delay in filing his claim? See page 562.

If you were working for an architect who made unjust demands and were sued by the owner because you would not let the architect "put one over on you," what chance would you stand in court? See page 562.

If an architect or engineer insists on the contractor going to unnecessary expense in protecting work, is the contractor entitled to payment therefore beyond the contract price? See page 563.

Develop new business by making helpful suggestions to property owners. Ways in which this has been done, and which you can utilize, are explained on pages 570-571.

A man who had trouble with leaking valleys wanted to know the best method of flashing them. So he wrote to BUILDING AGE. For our answer, see page 574.

If you want to know the best way to frame your sills, posts, etc., see pages 576-577.

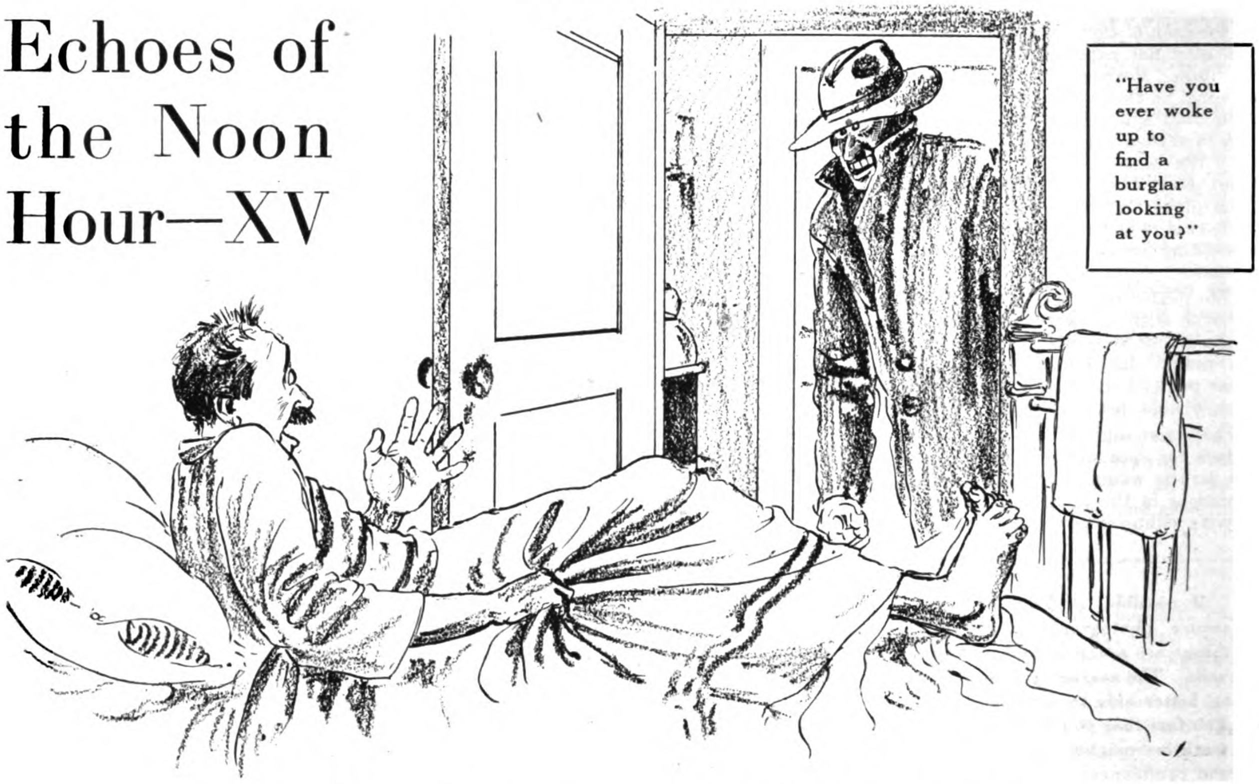
When chimneys leak, is it really leakage or is it something else? If you want to find out, read page 580.

When you put up concrete forms a time saving form clamp would prove worth while, wouldn't it? See page 580.

That is only part of this issue. It would take too much space to tell of all the worth while features, such as the house designs with complete details of construction and the other big features contained every month.

WATCH FOR THE DECEMBER ISSUE!

Echoes of the Noon Hour—XV



"Have you ever woke up to find a burglar looking at you?"

Ghosts, Real Hair Raisers, Stalk Mysteriously Through This Tale

By Edward H. Crussell

"Did any of you fellows ever wake up in the morning and find a burglar or a ghost, looking at you?" asked Bliss, in the manner of one who has information to impart.

No one answered.

"Well, did any of you ever figure out what you would do if you did wake up and find one?" he went on. "I'm telling you it's an awful feeling. I think I have as much courage as the average, but I never before realized how much of that courage depended upon my clothes."

"I'll be the goat," said Old George; "what is it you're talking about?"

"Talking about the burglar I found in my house this morning," was the reply, "and I ask you again, what would you do if you woke up and found a burglar, about 7 ft. high, peeking in at you through the doorway?"

"I guess I'd do the same as you did," said George, "shut my eyes and pretend to be asleep until after Mr. Burglar had gone."

This broke the ice, and amidst a general laugh, some half dozen different prophecies and conjectures concerning Bliss' statement were offered. One thought it a lie, pure and simple; another that it was a scheme of Bliss' to get his name in the paper; but Scotty, who was a friend of the family, explained that Bliss' wife was away visiting her folks, and that having got into money difficulties, Bliss had probably pawned the drawing room clock, and had invented the burglar story to deceive his wife.

"Never mind them, Bliss," advised Old George; "you tell us your side of the story. What hospital is the burglar in now? Or is he in the morgue?"

"Well," said Bliss, "I did have a little story to tell you about this burglar, but the versions these other fellows have given are so much better than mine that I'm afraid mine will fall rather flat."

He paused a moment, for effect, like the born story teller, and when he had secured their undivided attention commenced: "Part of your infamous story is true, Scotty; my wife is away, but as for the drawing room clock, I don't even know what a drawing room is. My bedroom at home opens off the kitchen, and as I lie in bed I can see through the kitchen to the hall door. As I woke from a calm and peaceful sleep this morning the sun was shining through every window in the house, and my eyes fell on a big tall fellow who was standing in the kitchen, just inside this doorway. Just as George suggested, I quickly shut my eyes again and pretended to be asleep, while I meditated some plan of attack or defence, and it was then I realized, with an all-gone feeling, how utterly helpless and unprotected a night-robed human is. In all my dreams of an occurrence of this kind I've always expected to have a chance to put on some clothes, never thought that I'd have to tackle a burglar in my bare feet."

"After this," said Farmer, in a loud aside, "he intends to go to bed with his boots on!"

"Oh dry up, Farmer," ordered the Kid; "if you keep interrupting the burglar will get away. Go ahead Bliss, what happened next?"

"As I lay there thinking," went on Bliss calmly, "I suddenly remembered that I had a big hickory club standing behind the bedroom door; it's a formidable affair, about 2 in. diameter. I cut it a couple of years ago when I was at Brighton, intending to carve a walking stick out of ——."

"To the Dickens with a couple of years ago!" yelled the Kid, "get on with your burglar."

"As soon as I remembered about this club," Bliss continued, "my heart went back into its place and I decided what to do. Gathering all my energy I took a deep breath, gave one jump, grabbed the club and sprang out into the kitchen, only to find that what in my half asleep condition I had thought to be a burglar was nothing but my own hat and coat, which I had hung on the upper corner of the hall door on coming home the previous evening! The only thing my wife's absence has to do with the matter is that when she is home I don't hang my hat and coat on the hall door."

The comment following this stirring (?) tale can be better imagined than de-

scribed. Old George remarked that: "The effects of bad whisky on a weak head were awful." But the Kid said, in a tone of disgust, "All ghost stories end just that way."

"By golly," said Shorty, "if that's a ghost story, then I know a ghost story. You remember when I was away, working on that stable in the suburbs? Well the day I finished up I was putting a grating over a drain in the floor. The drain was nothing but a 6 in. elbow, connected to about 20 ft. of pipe, which ran out onto the hillside back of the stable. The floor grating was a wrought iron affair, hinged to the plank floor with a couple of staples. I was hustling to get through, and with the grating turned back was banging away at one of the staples when the head flew off my hammer. I scrunched up my neck and drew my head down into my shoulders to avoid the falling hammer—you know the feeling—and waited for it to come down. Well, I waited about three minutes, and then got up off my knees to see what was keeping it. There was no place for it to hide, but I searched that stable high and low and not a sign of that hammer head anywhere.

"After some minutes gazing around my eye was attracted by the open drain in the floor, and I suddenly remembered that while waiting for the hammer to come down I had heard a faint click issue from the drain. Putting two and two together, I went around to the other end of the drain, and sure enough, there lay my hammer head just outside of it; it had evidently slipped off the handle, just at the proper place, and with the proper curve, to enter the drain without touching it."

"You're improving right straight along, Shorty," said Scotty; "you'll soon be able to tell the truth with any of them. Let me tell you a real ghost story.

"Two or three years ago I had a job with a scale company. I was the only woodworker they had, and had the third floor all to myself. The machine shop was on the second floor, office and salesroom on the ground floor and paint shop on the fourth floor under the roof. Things used to get pretty lonesome on my floor, but what with the woodwork of the scales, the patterns for new scales and for repairs, and the making of packing cases for the finished product, I didn't have any spare time on my hands and managed to get along.

"I had been there a little while, and had got pretty well used to the place, when one day as I was working at the bench someone started cussing me till further orders. I jumped around, but there was nobody there, and while I looked the rough talk still went on. I had an idea that some fellow from another part of the shop had hidden himself with the idea of having a game with me, but I haven't much use for a practical joke anyway, and not liking the talk he was using, I made up my mind to catch him, whoever he was, and teach him some manners. I looked under the bench and every other place where a person could possibly hide, and not finding anyone began to think the affair a little uncanny. Here I was, three stories up from the street, in an almost empty flat, and some unknown voice summing me up in no uncertain terms.

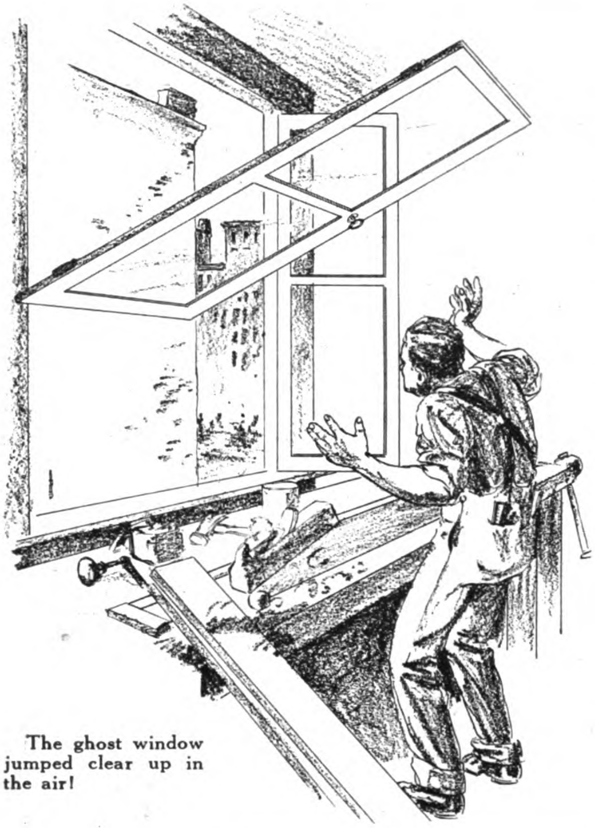
"While looking around I caught sight of the open window. There was a blank wall across the alley, about 25 ft. away, and while I didn't think it any use, I had looked everywhere else, and now crawled up on top of the bench and took a peek out of the window—the mystery was solved. Directly under the window the telephone cables passed, and sitting on a small seat, which was hanging from one of the wires, was a lineman engaged in making a joint in one of the cables. He had burned his fingers, and the bad English he was using was directed partly at his equipment and partly at his workmate, who was standing at the foot of the pole at the end of the alley.

"I was about to tell him, in a still small voice, that if he swore he would catch no fish, when I suddenly remembered my dislike for practical jokes, and realizing that a sudden start to one in his precarious position might mean an accident I got down off the bench and went on with my work.

"But that wasn't the real mystery," he added hastily, as some of the others made as if to speak. "No; that happened some days later. The window I have mentioned was a casement affair opening in two halves, each about 2 ft. wide and 6 ft. high. I was working at the bench again, near the open window, when one-half of it suddenly jumped into the air and fell over toward me. I was just in time to grab it before it broke itself over my head. Now comes the mystery. I at first supposed that the hinges had given way, or something like that, but an investigation at once proved that nothing was wrong with them, or with any other part of the window. The window was hung with those old-fashioned two-leaf hinges, the bottom half of which have a pin, over which the upper half slips. As before, I made a thorough investigation, not forgetting to look outside the window, but could find no solution to the problem. I replaced the window with some little trouble, owing to the difficulty of getting both the upper and lower hinge in line at the same time, and then I looked around some more. There was no wind blowing, and even if there had been, it would have taken a queer kind of wind to do what had been done. To get the window off it had to be open far enough to clear the head of the frame, and must then be lifted straight upward for nearly 2 in. until one-half of the hinge cleared the other; I was nonplused. Every few minutes through the day I would stop and figure the problem anew, but could find no solution, and by the end of the day I was almost ready to believe I had dreamed the entire occurrence.

"The next day two of the machinists brought some pieces of tin pipe and some tools up on to my floor, and then the mystery was solved. Before my time in the shop there had been a speaking tube from the office to my bench, and the day before these men had started to repair it. In taking out the old tube they had pushed it upward, and the window being in the proper position the pipe

When Bliss announced what his burglar was, old George remarked, "The effects of bad whisky on a weak head are awful."



The ghost window jumped clear up in the air!

had struck the bottom of it, pushed it off its hinges and then disappeared. The bottom of the window only cleared the top of the bench by a couple of inches, and I was too busy catching the window to notice anything else. I paid no attention to the hole where the speaking tube came through the bench, because the bench, being an old one, was bored full of holes anyway."

"Yes," said the Kid, as the whistles blew, "that's a ghost story all right; ghost stories always end just that way, either that way, or they don't end at all."

(*To be continued*)

New Publications

Mechanical Drawing Problems. By Berg & Kronquist. This is an elementary text book that is well adapted to the teaching of mechanical drawing. The exercises are all well graded, so that the student can progress from one step to the other with a minimum of difficulty. The plan upon which the various problems are based is pedagogically logical. The problem is stated in the form of a specification sheet and a layout sheet, from which the student prepares the completed drawing. The specification sheet states the problem in detail, and is sometimes supplemented with material emphasizing the thing to be taught in the problem or furnishing relative information.

The problems are based upon various mechanical details, working drawings being required. A small amount of architectural work is also given, and various geometrical problems are illustrated, these problems being those which generally crop up in every-day work.

The book contains 223 pages, size 8¼ x 6, is profusely illustrated, bound in cloth, sells for $1, and is published by the Manual Arts Press.

Concrete Stone Manufacture. By Harvey Whipple. The man who is interested in concrete blocks and their manufacture will find much valuable material contained in this work, this being the second edition of the book, which has been revised and thoroughly brought up to date. The book describes the development of concrete building units, and what is comprised in concrete stone manufacture.

The material used and the proportion of mix constitute the basic principles upon which successful stone manufacture is based, and this data is thoroughly gone into in this book.

After deciding upon the particular kind of block to be manufactured, size, finish, etc., the problem of choosing the right equipment to make them becomes of paramount importance. A chapter is devoted to this subject, numerous illustrations pointing out the different types of machinery used, and their uses.

Some space is devoted to a discussion of the layout and operation of a factory, so that the incoming and outgoing material may be handled with the expenditure of a minimum of time, space and energy.

Special molds and patterns are treated at length, the reader being shown how to prevent the concrete from sticking to the mold and other valuable information of a like nature.

The appearance of the finished block depends much upon the surface, for the texture and color of the block are what are the deciding factors to the average layman. Various methods of coloring concrete blocks, and different textured surfaces are well explained.

The book is fully indexed, contains 318 pages, size 5 x 7 in., is illustrated by drawings and photographic reproductions, is bound in cloth, sells for $1.50, and is published by the Concrete-Cement Age Publishing Co.

A Practical Course in Wooden Boat and Ship Building. By Richard M. VanGaasbeek—Perhaps never before has the average builder and carpenter taken so much interest in shipbuilding, for the trade has not only offered him a good living, but has also given him a chance to be of very practical patriotic value.

Books upon the subject of shipbuilding have in the past been mainly of a technical nature, difficult for the average house carpenter or builder to understand. The book under review is especially written for carpenters and other woodworkers who desire to engage in boat or ship building and it therefore approaches the subject from a viewpoint which the average building mechanic can readily understand and appreciate.

The book both explains the principles and shows methods. It shows how to lay out sheer plans, body plans, etc., so that the principles of laying out a ship may be thoroughly understood.

The book goes into a good explanation of the construction of a ship, numerous line drawings and photographs showing how the different parts are constructed. This particular part of the book is one of the most valuable sections, and will undoubtedly be of value to every carpenter or builder who is interested in shipbuilding.

Labor-saving devices for sawing and handling large timbers are illustrated and described, together with other machines that speed the work along. The manner of raising the frames and putting the ship together, is illustrated profusely by actual photographs.

A complete list of tools used in wooden boat and ship building are illustrated and described.

A valuable section of the book is a chapter devoted to wooden boat and ship terminology, which lists alphabetically the various terms used. A good index makes the book handy for reference.

The book contains 204 pages, size 5 x 7½ in., is illustrated by 119 illustrations, which include line drawings and reproductions of photographs, is bound in cloth, sells for $1.50, and is published by Frederick J. Drake & Co.

Legal Department

Where Law Limits Height of Buildings Can Height Below Maximum Be Regulated

The courts of West Virginia recently held that a city cannot prevent an owner of property in a built-up section from erecting a one story building among three and four story buildings by refusing a building permit under a charter provision which authorized it to regulate the height, construction and inspection of new buildings erected within its corporate limits.

In this case a property owner brought suit for a writ of mandamus to compel the issuance of a permit to erect a one-story building. It appeared that the city did not want buildings of less than three stories erected in that particular locality which comprised some of its busiest thoroughfares.

The court directed that the building permit be issued saying that the charter provision only allowed restrictions to be made for the safety of persons and property and that the city had no right to make restrictions for the benefit of their property owners or to effect symmetery or ornamentation of a city, street or section.

What Does "Working Days" Mean in a Contract?

The words "working days" have just been defined by the New York Supreme Court.

In this case suit was started on a contract which was dated Oct. 19, 1916, and which provided for the erection of a sewer, work on which was to be commenced within ten days after the signing of the contract and completed on or before the expiration of one hundred working days. A penalty of $10 per day was charged for every day's delay after the expiration of the one hundred days.

The plaintiff contended that the words "working days" meant days when the contract could be properly done, weather conditions considered. The defendant contended they meant calendar days, Sundays and holidays excepted. It appeared that one hundred calendar days (Sundays and holidays excepted) from the date of the contract would carry the time to Feb. 13, 1917. The contract was not completed until April 29, 1917.

The court said:

"No determination is found in the courts of this State as to the meaning of the term "working days" but generally speaking it means the days occupied in employment as distinguished from holidays and Sundays. This, however, is not conclusive, because in some lines of business it is disregarded. Night shifts are common in many occupations, so that the meaning of the term must be time employed within twenty-four hours whether day or night. In maritime law it has two meanings. While at sea all days are alike regardless of holidays or Sundays because in the very nature of the business seamen are on duty subject to call at all times, but when in port holidays and Sundays are in many cases respected because the work of loading and unloading depends upon the usages of men ashore. But weather conditions usually are not considered. It has been held, however, that working days allowed for unloading and did not include rainy days in the unloading of a cargo of salt. It is seen therefore that no general rule can be adopted and that consideration should be given to the circumstances surrounding the given case."

"Following these suggestions, I am of the opinion that in the present case the term 'working days' means days when the work of excavating for and the construction of a sewer could be reasonably expected to proceed, weather conditions in this severe winter climate being considered."

All readers are invited to ask any questions whose solution will help them solve any legal difficulty that they may be in. Our legal adviser, George F. Kaiser, LL.B., will answer direct by mail and give his opinion as to the correct procedure. Such of the questions and answers as are of general interest to the trade will be published in these columns.

All inquiries must be accompanied by the name and address of the correspondent, so that he may be answered direct or that he may be requested for further information if necessary to the intelligent answering of his question. No names will be published, only initials or a nom de plume. Remember that this service is free to subscribers.

Address Legal Department, Building Age, 243 West 39th Street, New York City.

Where Lien Law Does Not Cover Entire Contract, Can Contractor Obtain a Lien?

The Supreme Court of Illinois decided recently that under a contract to build a sidewalk and install pipes, etc., a contractor is not entitled to a lien, although the mechanic's lien law of that State gives a lien on sidewalks.

Suit was instituted to declare a lien for paving a street, lay a sidewalk and provide arrangements to have gas and water mains constructed in the street. There was no dispute that the work was properly done under the contract. The sole question at issue was whether the mechanic's lien law authorized a lien where there was only one contract for work on part of which the statute gave a lien and on the other part of which no lien was provided.

The court decided that the mechanic's lien law must be construed strictly, and as only one price was mentioned for all the work and there was only one contract for it, the lien could not be enforced as to part of the work done when there was no lien for the entire work.

The Supreme Court of Kansas recently decided that a builder is liable to those furnishing materials to the amount of the contract, where the contractor becomes insolvent, and is unable to perform the contract, and the owners agree to complete the job, and to pay for the materials and labor furnished and not already paid for, not exceeding in value the contract price.

Can City Prohibit Exterior of Buildings to Be Used for Ad Signs?

The question of a city's right to prohibit by ordinance the use of building surfaces for advertising signs was brought up in a recent Florida case. The court held that a city cannot deprive a person of a legitimate use of his property merely because the use he makes of it offends the esthetic tastes of other people in the community and as the signs which were advertisements were neither lend, vulgar nor obscene they should have been allowed.

It was therefore decided that the man

who had been arrested, sentenced and fined should have been discharged because his sign, was not dangerous to persons using the street or adjacent property nor offensive to morals although the words, letters and coloring might have offended the esthetic tastes of some citizens.

What Is a Waiver?

An interesting case on the question of a waiver of contract provisions was recently decided in the courts of New York. On May, 1909, a contract was entered into for the sale of 175,000 barrels of cement to be ordered before March 1, 1913. On March 1, 1913, 36,000 of the barrels provided for in the contract remained unordered. Between March 1, 1913 and May 8, 1913, 1900 barrels were ordered. The market value of the cement at that time was $1.62 per barrel. The buyer claimed he should pay $1.41 per barrel for the 1900 barrels on the theory that the seller waived his delay in ordering the barrels contracted for. The seller contended that he should be paid $1.62 per barrel for the 1900 barrels on the ground that it was a new contract.

The court held that evidence of the default in ordering the remaining barrels was a question for the jury to decide, stating that a waiver is:

"An intentional abandonment or relinquishment of a known right or advantage which but for such a waiver the party would have enjoyed." The court further said: "It is the voluntary act of the party and does not require or depend upon a new contract, new consideration or an estoppel."

Legal Interpretation of Government Restrictions on Building

From C. H. B., Iowa.—I want to take advantage of your Legal Department and see if I can get a correct interpretation of the recent Government order on building restrictions.

I thought perhaps that you would be able to do something besides guess at it.

Answer—In the *Official Bulletin* of Sept. 14, 1918, Otto Eidlitz, President of the United States Housing Corporation, stated that it is the desire of the Government that all buildings not required for essential war work be suspended during the war except where they may be indispensable to the health and protection of the civil population. If you will take your October copy of BUILDING AGE and turn to page 497, you will find a rather full article on the Government's orders as regards building restrictions.

Can Corporation Practise Architecture

From C. P. F., Cal.—Will you please advise if corporations can practice architecture in California. There is some talk that they can. What do you think about it?

The Supreme Court of California in the case of Binford vs. Boyd (174 Pac. 56), decided June, 1918, answered this very question when it held the California statute making it a misdemeanor to practice architecture without a certificate applies to persons only and not to corporations.

The Court said:

"Prior to this statute there was no restriction upon the right of any person to contract for or to furnish plans and specifications for another, or to follow the profession of architecture. All persons were at liberty to form corporations for any lawful purpose, and such corporations when formed, had full capacity and power to make all contracts necessary or convenient for the carrying out of their lawful powers. The statute cannot be upheld as a police measure on the ground that it tended to promote the prosperity of those following the profession of architecture by giving such persons who could obtain a license an advantage over others.

"It can only be upheld upon the theory that the Legislature believed that it was injurious to the public interest to allow unskilled and unqualified persons to prepare plans and specifications for the erection of buildings owing to the dangers which might arise from defects in plans or construction. The terms of the act show clearly that it was directed only to individuals as distinguished from corporations. It requires an examination of the person who applies for license, and its language shows that a license can be given only to human beings and not to artificial creations such as corporations. As a corporation could not obtain a license to engage in the profession of architecture and as it must act wholly by human agency, it could engage in that art or business only by employing individuals who would carry on that business as its officers, agents or employees. The act is effective upon corporations only to this extent: that if it undertakes to do business of that character either the persons whom it engages therein must be certificated architects under this statute, or, when contracting for plans and specifications for the erection of buildings for other persons, such persons must be informed that the plans and specifications will be prepared by some one who is not a certificated architect. The act does not prohibit a corporation from contracting to furnish to another person plans and specifications which are to be prepared by a third person who is a certificated architect. Nor is there anything in the object of the act, or the evils to be removed thereby, which would raise the necessary implication that it was intended to prevent such practice. The main object of the act, so far as furnishing plans and specifications alone is involved, was to secure the erection of buildings from plans prepared by those who were sufficiently schooled in the profession to secure a license from the state board and who had complied with the state law by securing such license. But it was deemed best to qualify the absolute prohibition of the law by allowing the owners of property and persons who were not certificated architects to contract freely with each other for furnishing such plans and specifications, provided the person furnishing the same informed the owner that he was not a certificated architect. It is obvious that if such plans and specifications have been prepared by certificated architects there could be no object in which the public are concerned which should prevent the sale thereof by the person who prepared them, or by some one to whom he has sold them. The act as a whole shows that it was not intended to prevent the sale of plans prepared by a qualified person, but to prevent their preparation by an unqualified person unless the purchaser was informed of that fact. The act does not forbid a corporation to employ certificated architects, have them prepare plans and specifications and then furnish such plans and specifications to other persons. Either a corporation or an individual could do this without transgressing the terms of the act when interpreted in the light of its object and purpose. The corporation was therefor acting lawfully in the matter."

Country House Details—II

By A. Benton Greenberg, Architect

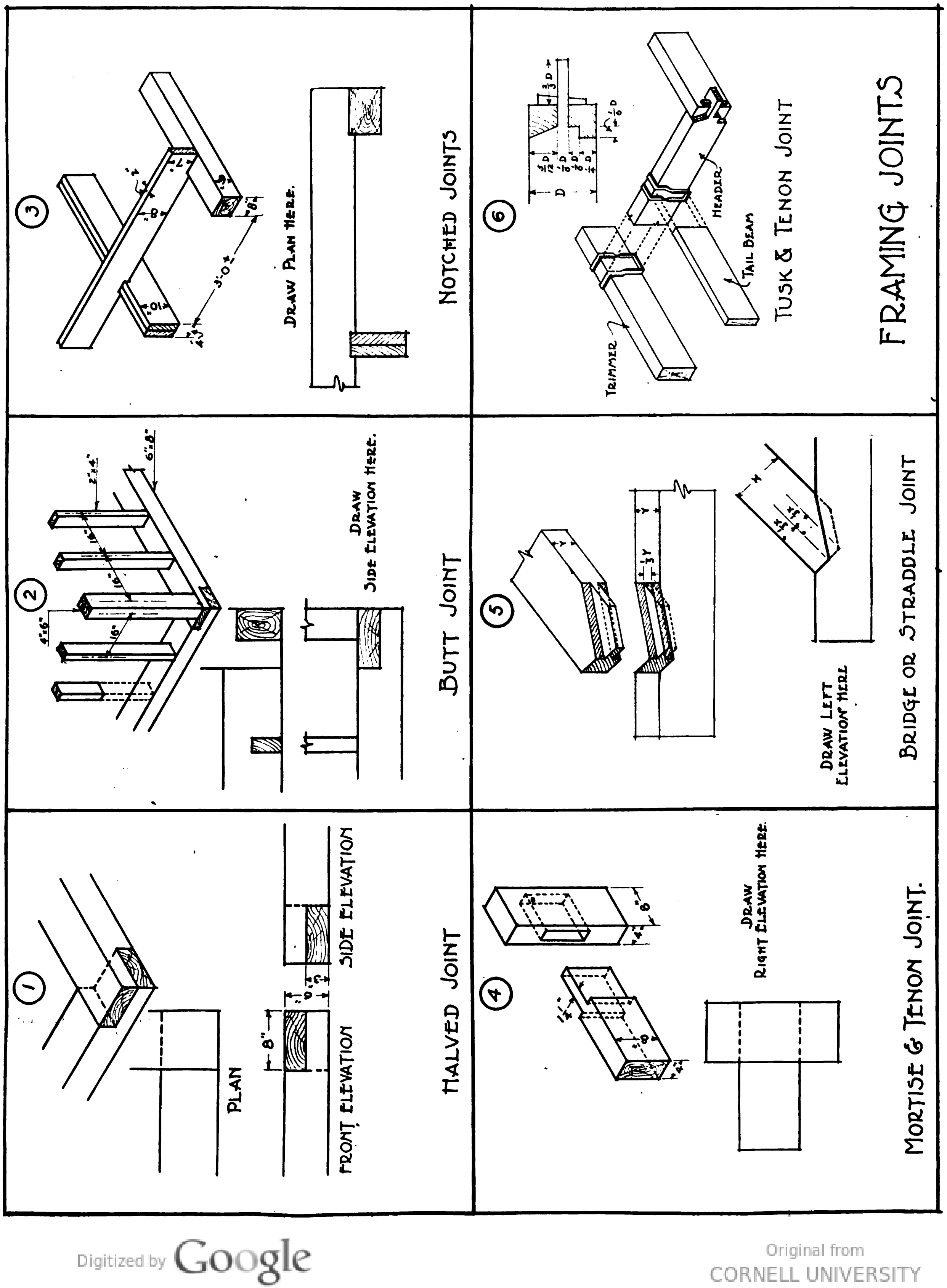
This plate shows the principal joints used in carpentry. The halved joint, Fig. 1, for the framing of the sill or plate at corners; the butt joint, Fig. 2; and the notched or checked joint, Fig. 3, which is used when two pieces cross each other and it is desired to reduce slightly the height of the upper member for purposes of alignment—these are all clearly illustrated and, therefore, need no further comment.

In the mortise and tenon joint, Fig. 4, the main precaution to be taken is in the proportion of the width of the mortise and of the tenon to the thickness of the respective timbers to which these parts belong. Experience has shown that if the width of the mortise does not exceed one-third the thickness of the timber into which it is cut, the sides or "cheeks" are not apt to cave in. Similarly, if the width of the tenon is not made less than one-third the thickness of the timber from which it is cut, then its strength will not be affected.

The form of mortise and tenon joint just described is applicable only to pieces which are perpendicular to each other. However, if the two pieces are inclined to each other, as in the case of a roof truss to connect rafter with tie beam, a modification of the mortise and tenon

joint, known as the straddle or bridge joint, Fig. 4, is used. All straddle joints require bolts or straps to resist the thrust of the rafter and to prevent it from sheering off the tie beam. Straps are preferable because they do not weaken the members by boring.

Headers and trimmers, which must be placed around all openings in a floor for the accommodation of chimneys, stairs, etc., are framed into each other with a tusk-tenon joint, as is shown in the illustration Fig. 6. The insert in the upper right-hand corner gives the proportions of the different parts in terms of the depth of the header (D). They are as follows: Haunchion 5/12 D, tenon 2/12 D, tusk 2/12 D, and shoulder 3/12 D. Headers and tail beams over 4 feet in length should be hung in metal stirrups or hangers.



Department of
Masonry Construction
CONCRETE, BRICK, ETC.
Practical Ideas Which Will Help You Do A Quicker and Better Job

How to Build and Fireproof with Hollow Tile—VII

Construction of Pipe Chases, Buttresses and Gables Is Explained

By J. J. Cosgrove

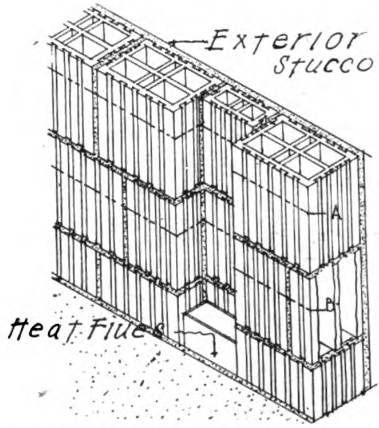


Fig. 51—Building a Pipe Duct for Hot Air Flue. Pipe chases must be run straight and in good alignment, with no projections to restrict size.

One of the precautions in building practice which will pay the most in time, in money and in good work, is to make provision for the steam pipes, plumbing pipes and hot air flues where they pass through floors and ceilings, and are run in walls and partitions. It is a precaution so seldom taken that the importance of it cannot be over emphasized in the interest of economy and good building. Provision for pipes is of importance in any kind of a building, but becomes of more importance in brick, hollow tile and reinforced concrete buildings. I have seen workmen spending days and weeks cutting through walls, partitions and floors of buildings to provide passage for pipes where provision should have been made in advance. The net result of their efforts was a big bill for labor, jagged holes where sleeves should have been built in, and gaping holes around pipes through floors where water when scrubbing can run down, while if sleeves had been properly built in there would have been raised bosses around the sleeves to prevent water from flowing through.

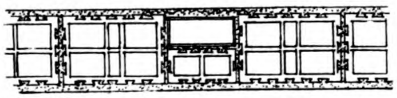


Fig. 52—After the pipes are in place, they must be plastered in like the rest of the wall. This can be done by stretching expanded metal across the face of the chase, which takes the plaster.

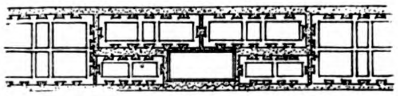


Fig. 53—This illustration shows how to break joints around a pipe chase.

The providing of pipe chases, ducts and sleeves, in buildings ought to commence in the office of the architect. On every set of plans there ought to be marked the exact size and location of openings. As architects seldom have draftsmen well enough posted in the design of mechanical installations, however, to take care of this part of the layout, the duty devolves naturally upon the general contractor. It will not do for the general contractor to brush this responsibility aside with the feeling that as it affects the work of a sub-contractor it is up to him to look out for the necessary provisions for his own work. Often the building is too far advanced by the time sub-contracts are let for the sub-contractor to have the necessary work done. Besides afterthought is costly, and when all is said and done it is usually the general contractor who must do the cutting and patching, so it is his profits which will suffer if he neglects to act in time.

A good plan is to notify each sub-contractor as soon as sub-contracts are let, to mark on the plans, and take up with the superintendent of the job, the holes they will want left, the pipe ducts to be provided, and all preparatory work for their respective parts of the contract. The manner of building a pipe duct for hot air flues from a furnace or indirect radiator stack, is shown in Fig. 51. It must be impressed on the minds of the masons, however, to run the pipe chases perfectly straight, in good alignment and with no projections to restrict the size. It is well to impress on them also the necessity of continuing the chase the full width from bottom to top, unless reduction of the ducts at different floors permits a corresponding reduction in the size of the ducts; and to make the chases at least one inch wider than the width of the hot air flues or pipes that will be concealed therein.

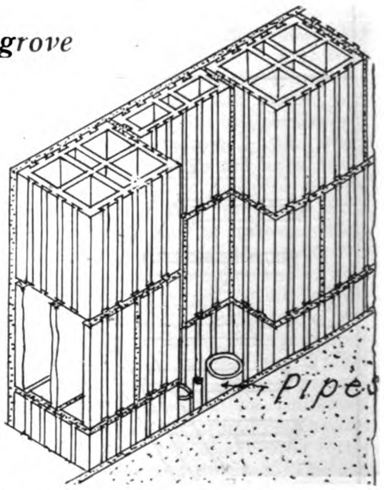


Fig. 54—Pipe chase for plumbing and steam pipes. A plan view is shown in Fig. 55.

When the pipes are in place, and if necessary tested, they must be plastered in the same as the rest of the wall. The manner of doing this can be seen in Fig. 52. Expanded metal lath is stretched across the face of the chase and secured in place, the opening can then be plastered when the rest of the wall is.

In Fig. 53 can be seen the manner of

breaking joints around a pipe chase. This is very necessary from a practical standpoint, otherwise there will be a weak part of the wall on this line which is liable to crack, or even to give way. By comparing Fig. 53 with Fig. 52 the manner of laying alternate courses will be seen.

Hot-air pipes are of uniform size throughout so it is a simple matter to determine the size of pipe chases for them. When we come to steam and plumbing pipes, on the other hand, a different condition obtains. Steam and plumbing pipes have hubs or fittings which are much larger than the pipes, and the ducts must be made large enough to cover these hubs and fittings.

Ordinarily an allowance of two inches more than the size of the pipe marked on the plan will be sufficient. For instance, if the plan showed a 4-in. pipe run in a wall, and a pipe chase was to be built for it, allowing 2 in. over and above the size of the pipe would make the pipe chase 4 + 2 = 6 in. square.

In concerning the size of pipes it is well to keep in mind that the outside of a pipe is larger than the rated size by an amount equal to the thickness of the walls of the pipe. For instance, a 4-in. pipe means inside diameter. If the walls of the pipe are ½-in. thick, the outside diameter would be 4½ in. As a matter of fact 4-in. wrought iron and steel pipes are just 4½ in. outside diameter.

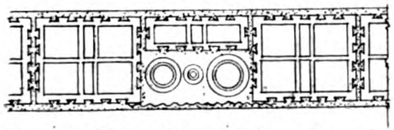


Fig. 55—Plan view of pipe chase for plumbing and steam pipes.

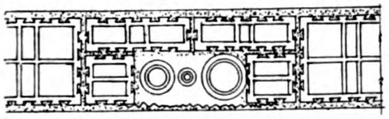


Fig. 56—Plan view of another course. Compare with Fig. 55, which will show how courses are broken.

A pipe chase for plumbing and steam pipes is shown in Fig. 54. This is a small chase for only three pipes although frequently they are much wider. A plan view of the duct can be seen in Fig. 55, and by comparing this with Fig. 56 will be seen the manner of breaking joints around the duct.

As was previously stated, pipe chases for plumbing and steam pipes are usually quite wide, and like pipe chases for hot air pipes, they must be covered in front with expanded metal or wire lath, so the pipes can be plastered in. In the case of hot air pipe chases, the spans are small and the expanded metal lath usually rests against the hot-air pipes, so that when plastered there is no "give" at that point. In the case of steam and plumbing pipes, on the other hand, the expanded metal does not come in contact with the pipes only at the hubs and fittings. As the spans are larger, this would be liable to create a weak spot where the plaster would crack if the plaster were not stiffened in some way. This can be done, as shown in the illustration, by fastening the wire lath to a studding provided for this purpose. The studding may be of wood, 2 x 2 or 2 x 4, according to conditions, or in strictly fireproof buildings, angle irons or T irons may be used for this purpose.

Buttresses

From the interior we will go to the exterior for the next detail to consider. The buttress is a very useful member of the building world. It is found in dams, retaining walls, factory walls, industrial walls of all kinds, long thin walls, and churches. In their simplicity they are props which bolster up the structure, thereby enabling it to bear its load or withstand thrusts. In churches buttresses are raised to the highest degree of perfection, particularly in Gothic design where flying buttresses are used.

In Fig. 57 is shown a buttress built of hollow tile. It is finished with stucco and has concrete cap and fill. This buttress is plain and simple in design, pleasing in appearance and easy to build. Fig. 58 shows a simpler design of buttress built of hollow tile with hollow tile coping and concrete fill. This is not nearly so ornamental a construction, the sloping edge lacking the graceful lines of Fig. 57 produced by breaking up the sloping surface by means of a concrete weathering, from the top of which the wall continues in a vertical direction to the coping.

Buttresses are probably derived from the classic pilasters which serve to strengthen walls where there is a pressure of girder or roof beam. Early English buttresses project considerably, sometimes with deep sloping weatherings in several stages, and sometimes with gabled heads. In some places on churches, they are richly ornamented with canopies and statues.

Gables

Gables are architectural features of great possibility when properly treated, and much thought and study is put in on them by architects and designers, for little will make or mar their beauty. The old Colonial architects seem to have gotten more out of the treatment of gables than any other style of architecture.

A gable built of hollow tile is shown in Fig. 59. This is divided in the center to show two types of construction. To the left the gable is built of full-size hollow tile blocks with brick fill. At the right the gable is built of half size hollow tile blocks and brick fill.

The rafter is shown in place to the left, while at the right the rafter is removed to show the way the walls ought to be extended clear through to the roof boards. Of course the walls would be plastered or stuccoed, and in practice, no doubt, the gable would be relieved by some sort of window or ventilator to break up the plain surface. A window is not shown here, for all that is desired is to show how the gable of a building can be filled in with blocks of hollow tile.

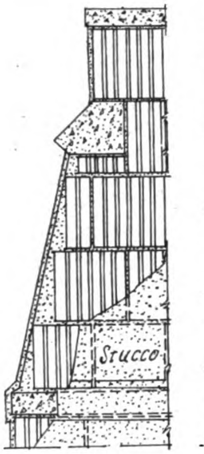


Fig. 57 — Buttress built of hollow tile, stucco-coated. It has concrete cap and fill.

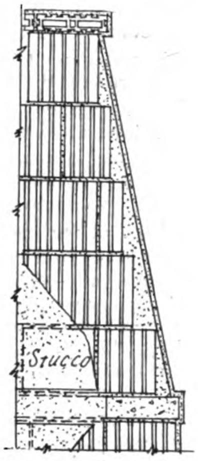


Fig. 58 — Another type of hollow tile, with hollow tile caping and concrete fill.

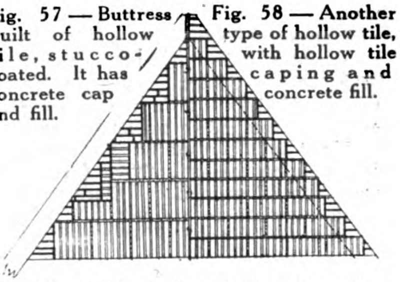


Fig. 59—Gable built of hollow tile. The illustration is divided so as to show two types of construction.

(To be continued)

Some Estimating Figures Used in Masonry Work

By John Upton

Every man who builds is interested in masonry and so some notes in regard to it may be useful.

There are two systems of measuring stone work: quarryman's and mason's. By the former, the actual contents are measured, all openings taken out and all corners measured single. The idea is to get the amount of material used.

By the mason's measurement all corners and piers are doubled and no allowance is made for openings less than five feet, and only half the amount for large ones. The idea is to get at the labor required rather than the material used.

One cord of stone, three bushels of lime and a cubic yard of sand will make one hundred cubic feet of wall. If cement is used instead of lime, the sand should be coarser; about six sacks of cement will be needed in making a one to three mortar, for a cord of stone. The best way is to use some lime and some cement added just before the mortar is used. This will save some on the cost and make a better wall than either alone.

Range work and cut work is measured

superficially, and in addition to wall measure.

Foundation and dimension stones are measured by the cubic foot.

Water tables and base courses are measured by the lineal foot.

Sills and lintels are measured by superficial feet. Walls are never considered as less than eighteen inches thick.

Excavations are measured by the cubic yard, irregular depths being averaged.

Concrete is measured by the cubic yard of twenty-seven feet. One bushel of cement and two of sand placed one inch thick will cover three and one-half square yards and if three-fourths inches thick will cover four and one-half square yards.

In doing brick work one will find that the size of brick vary according to the location and manufacture. An ordinary brick is eight and one-fourth by four by two inches. Some may be a little thicker some wider, and some a little shorter but brick work is generally measured by one thousand bricks laid in the wall. Some estimate twenty-two bricks to the cubic foot, not counting the mortar. Some go according to the square foot face of the wall. On a four inch wall there are eight common bricks to the foot. In a nine-inch wall there are fourteen common bricks to the foot. In a thirteen-inch wall there are twenty-two, thicker walls in the same proportion.

Mortar to lay one thousand brick will require one and one-eighth barrels of lime and five-eighths yard of sand.

Corners are not measured twice. Openings over two feet square are deducted. Arches are counted from the spring. Fancy work, one and one-half for one. Pillars are measured on the face only.

A cubic yard of mortar for brick requires a yard of sand and nine bushels of lime. A thousand brick closely stacked occupy about fifty-six cubic feet. One thousand old brick cleaned and loosely stacked occupy seventy-two feet.

One man can lay fifteen hundred brick in ten hours on a common wall, on face or front work ten to twelve hundred. Five courses will lay one foot in heighth.

Brick work will weigh one hundred and twenty lb. to the cubic foot and its safe bearing load is one hundred and twenty lb. per square inch for common brick in lime mortar. Hard brick in cement mortar will support two hundred lb.

One sometimes needs to know the weight of different materials used in building, also the weights they will safely carry. Brick weighs from 100 to 150 lb. per cu. ft., depending on the kind and the material used for the mortar. Sandstone weighs 145 lb. Limestone weighs 160 lb. Granite and marble weigh about 170 lb.

As mortar will weigh only about 100 lb., the masonry will not be as heavy as the stone, ranging from 130 to 160 lb. per sq. ft. Gravel weighs 120 lb. Clay or common earth (dry) 100, (wet) 120. Concrete will weigh 130 to 150 according to the materials used.

Granite squared in stone work will support 350 lb. per sq. in., sandstone 175, rubble stone in lime mortar 80 lb., the same in cement mortar 150. Limestone in squared work 250 lb. Concrete (1:2:5 mix) 150 lb. The safe bearing load of the soil must also be considered at times.

Hard rock in the native bed will support 100 tons to the square foot. Rock equal to the best masonry 30 tons and to good brick masonry 15 to 20 tons. Clay, when in thick beds and dry, 4 to 6 tons, fairly dry 2 to 3 tons, wet or soft clay 1 ton. Gravel and coarse sand cemented by nature 8 to 10 tons. Compact sand 4 to 6 tons, dry sand 2 tons, quicksand and alluvial soils ½ to 1 ton per sq. ft.

Points on Foundation Work

Practical Methods of Laying Out Squares, Octagons, Concrete Forms, etc.

By I. P. Hicks

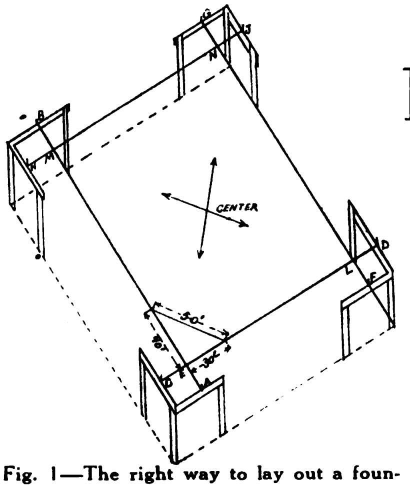


Fig. 1—The right way to lay out a foundation.

When a new building is to be started it very frequently falls to the lot of the carpenter, contractor or the boss brick layer or mason to lay out the foundation. This is the first step in the course of the erection of the building and has to be done even before the excavating can be started.

There is nothing difficult about the laying out of an ordinary foundation, yet like everything else there is a right way to go about the work.

First set stakes about two feet outside of each corner of the foundation lines. See figure 1.

Establish the height of the wall on one corner. If the ground is not level it is best to take the corner on the highest point of the ground to establish the height of foundation wall above grade. Locate the center of the foundation or nearly so and build up a temporary blocking to level from. Take a level equipped with level sights and sight to each corner of the foundation, marking the height on the corner stakes. Be sure that the level indicates level each time you sight across it. This will establish the height of wall at each corner, and if you are particular in leveling, your wall will never be out of level. Nail batter boards on the stakes at each corner, leveling the top of the boards from the height mark in each direction. The batter boards now represent the top of the wall at all the corners, and we are now ready to lay out the exact size of the foundation. Drive a nail in the batter boards, as at *A* and *B*, and stretch a line from *A* to *B*. Locate the front wall and stretch the line *C D*. To square the foundation use the well known principle of the 3, 4, 5 right triangle. Measure from *E* on line *AB* 40 ft., and on line *CD* 30 ft., then the diagonal should measure exactly 50 ft. to square the foundation.

If it does not come square move the line at *B* one way or the other till it does

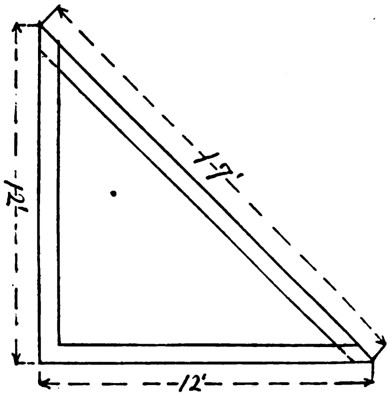


Fig. 2—A large triangle, built especially for the purpose of squaring up a foundation.

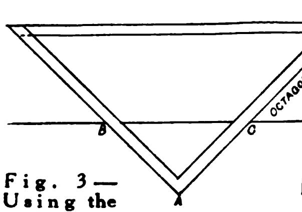


Fig. 3—Using the large triangle, illustrated in Fig. 2, to construct an octagon. Draw a line as B-C, take equal distances A-B and A-C, then A-C and C extended form an angle of the octagon.

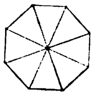


Fig. 4—To test an octagon, see that the diagonals are of equal length.

comes square, measuring the 40 and 30 ft. each time the line is moved to make sure it is right. Use a steel tape to measure with; cloth tapes cannot be depended upon for accuracy. Having squared the corner, set off width of building on batter boards, *AF* and *BG*. Set off the length as *CH* and *DJ* and stretch the lines which will form the exact size of the foundation, *ELM* and *N* being the corners. Drive stakes at these corners and you have the wall lines of your foundation. If necessary to excavate larger than the wall line for wall footings or other cause, allow for this and measure out from your stakes. Before taking up the lines mark on the batter boards the points, *AC*, *HB*, *GJ* and *DF*, then if for any reason you should want to locate a line you can readily do it. It also keeps the points from being lost when you want to start the wall after the excavating is done. The stakes and batter boards should not be disturbed during the excavating, for they give the corners of the foundation, and the height of the wall all around. Being set 2 ft. outside of the foundation line they can be left in till the wall is completed. Working in this way you are insured of a job that is square and level.

In squaring the building you can use the figures 15, 20 and 25, or 6, 8 and 10, instead of the 30, 40 and 50, if it is more convenient. We recommend the larger figures where the foundation is large enough to use these measurements, for they tend to greater accuracy.

Another good way to square a foundation is to make a large right angle triangle from boards. See figure 2. Take three 1 x 4's and put them together as shown and you will have a corner that is a perfect square. On account of the size of this square you can hardly make a mistake with it.

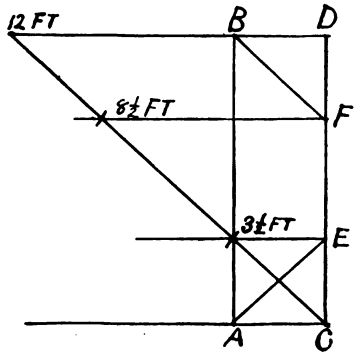


Fig. 5—An easy way to lay out an octagon.

If it is too large for convenient use make one just half this size. It will be found a very handy and sure way to square a foundation.

It can also be used to a good advantage to lay out an octagon. See figure 3.

First draw a straight line representing one side of the octagon, measure off on your square equal distance, as *AB* and *AC*, and place the square on the line as shown; then *AC* will represent the second line of the octagon which can be continued to the length desired. This process can be continued from each corner until the octagon is completed. From the starting line work both ways around the octagon, because in so doing you will be less liable to variations. It is necessary to be exact with measurements to avoid variations. After the octagon is laid out it should be tested to prove its correctness.

See that every side measures the same.

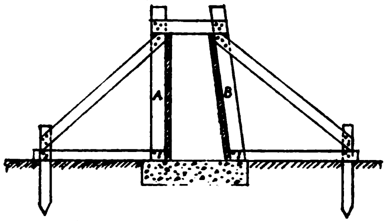


Fig. 6—Method of setting forms for a concrete foundation wall.

Then measure across from opposite angles on the lines as shown. See figure 4. Each one of these must measure the same to have a true octagon.

Use a steel tape to measure with.

Another easy way to lay out an octagon is as follows: Stretch two lines the width of the octagon from side to side, as shown by figure 5. Now take a 12-ft. pole and lay it across diagonally and make marks at 3½ and 8½ ft., drawing parallel lines as shown. Square across the lines *AB* and *CD*, then the lines drawn from *A* through *EF* to *B* will form three sides of the octagon. To complete the octagon measure the required distance on the first two lines *A* and *B*, and proceed in like manner for finding the other three sides.

Setting Forms for a Concrete Foundation

We will assume that the concrete footing has already been put in. On account of the footing, stakes cannot be driven close to the wall. Drive stakes from 3 to 4 ft. outside and inside the wall lines. See Fig. 6. Nail on the bottom stays and set up the uprights leaving the required space for the wall, allowing for the boarding. Nail on the braces as shown. Standard *A* is set plumb. Standard *B* is set on a slant for a battered wall in case such is wanted. These can be set any way desired. Nail a piece across at the top to keep the form from spreading. All must be thoroughly spiked or the concrete, being very heavy, will force them out of position. The planking needs only just nails enough to hold it in place. With 2 in. plank these forms should be spaced not over 6 ft. apart.

Do not take down the forms till after the concrete has thoroughly set; then remove the top piece, the braces and bottom pieces; pry the standards loose from the plank with a pinch bar and it will be easy to take down the plank.

Are Separate Flues Essential?

By C. C. W. Peck

It is human to place fault at the nearest station. It requires too much real investigation and observation to diagnose accurately. The best physicians are the rarest because they are the ones that can perceive the real causes. It is easy to express an opinion but difficult to possess correct ones.

When a chimney is built with one flue all difficulties that may exist are generally laid to the single flue. Usually no attempt is made to find other causes. Two houses standing side by side may each have chimney troubles; but should one have a single flue with more than one fire that condition will be held responsible by nearly all investigators, while the troubles next door will be laid to a variety of causes.

A long experience and wide investigation shows that a plurality of fires can be operated on a single flue with as large a percentage of successes as with chimneys built on the old plan of a flue to each fire.

Many two-family houses are built with four fires and four flues, and the majority of these houses have more efficient drafts on the first floors than on the second. This is due to the fact that the greater chimney height above the first floor gives a greater degree of that condition known as "partial vaccum" to the lower fires. Should the second floor flue be increased in height until the top of the flue was as high above the second floor fire as is the top of the flue above the first floor fire, then equal results would ensue. This principle obtains whether one or two flues are used.

Nearly all defects affecting single flues exist in connection with multiple flues,

while each have a few characteristically individual defects.

Very large flues sometimes have as many as twenty fires working successfully on them, but one small fire among the number will not start the flue into successful operation alone.

In a neighboring city there is a six-inch chimney flue with six fires attached. It naturally gives such poor results that the families living there are frequently moving out. Nearby is a two-family house having two steam furnaces of medium size working on a chimney lined with a flue 8½ x 13. When one fire, in this case, is operated alone a good result follows; but when both fires are run there is too much draft on windy days. This is, however, controlled by an extra damper in each smoke flue.

When a two-family house has both furnaces and ranges, it is best to equip the chimney with two flues, one for each family, placing the furnace and the range of one family on a given flue and a furnace and range of the other family on the remaining flue. The general average size of flue may be 8½ in. x 8½ in., with the upper two lengths of flue lining increased to 8½ in. x 13 in. The effect of increasing the size at the top is to increase the velocity of draft below, as the flow of air must be more rapid in the smaller flue to keep up with the quantity of flow in the larger flue.

The thimbles of the range connections should extend an inch into the chimney flue at the lower edge, and the corner should be slightly chipped away at the top edge.

When a two-family house is built with an all gas kitchen, the really modern way, and there are two furnace fires to be provided for, the chimney may have one 8½-in. x 13-in. chimney flue. This will cost considerably less than a chimney with two flues, and if properly constructed will give good satisfaction.

Unless more than twenty feet away, the chimney must be at least one foot higher than the ridge of the house. It should be straight from bottom to top. The flue joints should be set even and mortared tight. It will be prettier and more modern if built on the outside of the house but will chill more easily. The two smoke flues must not be put in side by side but one over the other, and the size of the flue should be reduced from the bottom to a point just over the upper smoke flue thimble to prevent the air from settling down on one side of the chimney and passing up on the other without drawing on the fire.

Where separate cellars are used and one of the heaters must have a long flue connection, set the one requiring the best chimney conditions nearest to the chimney and at the lowest position. Should one of the furnaces have more intermediate sections than the other it will require the best position to overcome the extra friction of passing through the sections.

An open check draft on one of the furnaces may affect the draft of a twin furnace. In this case the check can be disconnected from its chain action, and a smoke pipe damper substituted in its place.

Building a Centering for Circular Brick Arch

Details Showing How Center Is Constructed

By E. V. Laughlin

Not long ago I observed a carpenter building a circular arch for supporting the brick that were to crown a wide entry way to a public building. He was fuming and stewing in his attempts to shape an arch that would be part of a perfect circle and was having a hard time to round the affair so that it would be a durable and presentable job. He had spent a day working on the arch, and was not yet through. This in spite of the fact that he was a very good carpenter and desirous of killing no time. I showed him the method that I had seen employed elsewhere and which I used myself. Following this plan the man constructed the desired falsework in less than two hours. For the benefit of those who may desire to construct similar falseworks I give the details of the method.

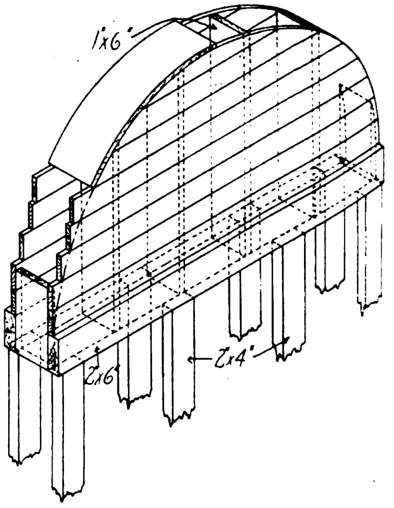
The method I am about to describe is suitable for any kind of openings—doors, windows or entryways. Select two 2-in. by 6-in. timbers one-half inch shorter than the width of the opening to be arched. Next secure pieces of 1-in. by 4-in., 1-in. by 6-in., 1-in. by 8-in., or wider material if the wall to be arched is additionally thick. Consider the 2-in. by 6-in. pieces above mentioned as girths, and the 1-in. pieces as studs. Space the studs one foot apart, and nail the girths at right angles to their aligned extremities. Thus fashioned the ends of the studs act as headers between the girths, greatly strengthening and stiffening them. On both sides of the studs, above the girths, nail shiplap or sheeting, carrying the same as high as the height of the center of the arch above the level of its extremities.

The rounding of the arch is the next important detail, and is the one in which the greatest difficulty is ordinarily experienced. If the arch is to be properly proportioned, however, certain very definite items must be observed. Making the arch the half of a perfect circle produces the most artistic effect. To make it in this way proceed as follows: Determine the mid-point of the upper edge of one of the girths previously mentioned. From this as a center, and with a radius equal to half the length of the girth, inscribe a circumference on the shiplap nailed above the girths. If correctly constructed this half-circumference will begin at one extremity of the girth and end at the other extremity.

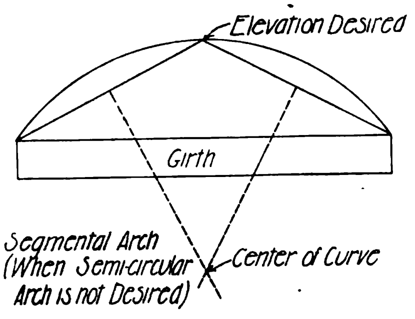
A quickly made compass for marking off this arch circle may be made in the following manner: Drive a nail through one end of a light strip of wood, continuing the same through the mid-point of the girth above mentioned. Drive another nail as far from this one as half the length of the girth, letting the same project a quarter-inch through the wood. The curve of the arch may then be scratched with perfect ease, a keyhole saw or small-bladed saw will follow this curve line with perfect ease, and will leave the arch line artistically rounded.

In order to secure a surface upon which to rest the bricks a flexible board must be bent down over the arch just described and securely nailed to the studs and the upper edge of the shiplap. In the absence of such a board, lath answer fairly well.

For narrow doors and for windows a semi-circular arch is seldom desired. The curve is more artistic, though, when it is part of a perfect circle. To secure this effect proceed as follows: Erect a perpendicular on the girth from the mid-point previously described. Locate the point on this perpendicular that marks the highest point in the desired arch. Draw straight lines from this point to



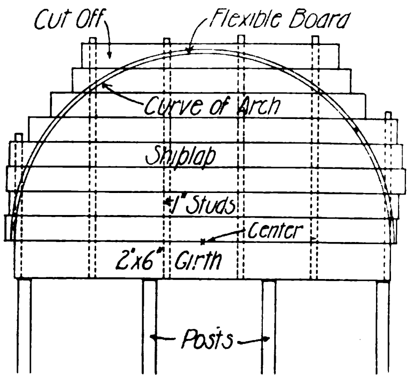
Perspective of form used to build circular brick arch.



Compass for marking off shape of head of form.

the extremities of the girth. Find the mid-points of the straight lines just drawn and erect perpendiculars at these mid-points on the straight lines, continuing the same until they intersect. Using this point of intersection as a center, describe a part circumference as explained above. The curve formed will be part of a perfect circle, but will not extend very high above the girths. The method of making it is accurate, being geometrical in character.

The arch in its finished form may be supported in position by posts placed underneath. These should be toenailed into the girths, and should rest securely upon stone or wood footings. The fact that the arch is a trifle less in length than the opening to be spanned makes it easy to remove it after the bricks have been placed in position.



Elevation of form, showing portions cut off, and flexible board.

THE EDITOR'S PAGE

Amendments to Government Restrictions on Buildings

Since the publication of our last issue the Government has made certain amendments to the announced restrictions on building. The most important of these is that farm buildings costing not more than $1,000 will be permitted to proceed without the requiring of a special license.

In detail the amendments outlining the classes of construction that need no license are as follows, the amendments being placed in quotation marks:

Subdivision 2.—Repairs of or extensions to existing buildings involving in the aggregate a cost not exceeding $2,500, "and new construction for farm purposes only involving in the aggregate a cost not exceeding $1,000."

Subdivision 4.—Those directly connected with mines producing coal, metals and ferro-alloy minerals "and production, but not refining of mineral oil and natural gas."

The under-built condition of the country is such that modifications in the restrictions are hoped for by many just as soon as the winter is over. Then coal and transportation space will possibly be not so urgently needed as is the case at present.

After the War—What Then?

Good will is the biggest asset that any business can have. When advertising is sold it should be sold on that basis and not on the mere number of inquiries expected. When a man expects to get work he must build it up on that same basis, for he is advertising his ability and must expect to build up general good will for it.

Not long ago everyone knew of Sterling, the Seven Point Gum. It was then as well known as Wrigley's Spearmint, which has been the fortunate recipient of continuous publicity. But now? Sterling has lost its easy facility of being on everyone's tongue, while Spearmint would be played as a big favorite on any publicity course where the best known product was to flash first under the wire.

Take Gillette, the safety razor. The man who tried to buy Gillette blades a few weeks ago couldn't get them and his dealer couldn't tell him when he could get them. Substitute safeties jumped into the breach and carried off the sales. Gillette is back in the field again, with a strong good will campaign that it is hoped will put the razor back in the popularity that it had before Uncle Sam required the output. A bit of general publicity explaining the situation and telling when the blades would again be on the market would have done wonders to retain good will.

Bull Durham realized this. Widespread publicity was given to the fact that Bull Durham was helping Uncle Sam to win the war. This firm's good will is being enhanced, not lessened, by its service now.

Advertisers do not generally realize just how important this good will is. Because their output may be either curtailed or else entirely bought by Uncle Sam is no reason why they should allow themselves to be forgotten.

Nothing, absolutely nothing, is so fleetingly evanescent as the memory of man. The man or firm that holds itself as too big to be forgotten is due for a long, quick tumble. Who remembers Sunny Jim of Force, famous in his day, but now relegated to the dealer's back shelf to join the ranks of those too big to be forgotten?

Remember this: It is the man or firm who is remembered and thought of *now* who will be remembered and thought of when the Big Peace Business Rush begins.

The architect who cut off his connections and closed up his offices to go to work for the Government is not going to stand the same chance as the architect who kept his name known and his connections open even though now working for Uncle Sam. By visits here and there, and by an urging of "plan now" even though his percentage does not come until after the war, the man who keeps his connections open will have his hands on more business after the war than he can handle. He will be in a position to hire the man who has allowed the war to steal his identity.

The small builder, even the journeyman carpenter who does odd jobbing work, even these cannot afford to overlook the opportunity to build good will now.

By capitalizing in the town's newspaper every chance for publicity offered when any sort of a job is done, by building up friendships now which will help to build up business later, by studying and fitting himself to hold his own in the best and biggest work offered—by doing these things the man who is at home to-day can more than hold his own with the mushroom competition that will spring up on every hand after the war.

Build Good Will now. Bend every effort to grasp and hold the opportunities that Peace is soon going to offer to the man whom it is known is fitted to take them.

Dealers' Department Discontinued

There is so much material of interest to the lumber dealer in BUILDING AGE that the publishers have decided to omit the Dealers' Department for the present, beginning with this issue. This step is

taken partly as a result of the Government's request for increased economy in the use of paper.

From time to time, however, special articles of interest to the dealer will be published, together with practical articles dealing with the relations of dealer and contractor, pointing out ways and means by which increased business for both may be secured.

Build Up Confidence in Yourself and in Your Work

Confidence in yourself and the confidence of others in you—these are the two factors that enable success to rear itself upon their firm foundation.

That means knowing your job. And knowing your job, to do it right. Granted this, work will come to you as the man who knows how to handle it.

The man who throws his buildings together with tobacco juice and a prayer is not the man whose reputation or ability is above reproach. The local banker would not choose him to build the new mansion on the hill, nor would he extend him credit if the chance to swing a big contract presented itself. Such a builder would be trusted neither as regards his ability to do a good job, nor as regards his personal character as security for the extending of credit.

In both cases the fundamental cause would be—lack of confidence.

A man must have sufficient confidence in himself and his ability, to enable him to resist the temptation to skimp more than is good for the work. A ten dollar bill saved here, a five saved there, and a few more dollars saved some other place may result in a house being built for two or three hundred dollars less than what it would have cost if better work were done. Perhaps even more may be saved, and the skimping doesn't show the first year.

But five years from now such a house will be old, a fertile cause of budding expenses that blossom and bear a fruit that eternally damns the builder's reputation.

I know whole sections built up that way. Money tied up by penny-wise investors, homes bought by near-sighted suckers—the very thought is enough to disgust the man who believes in and works for the best that is in the trade.

Somebody buys these monstrosities. But people are beginning to be educated a bit in building. Newspapers are carrying articles on good construction, publishing plans, conducting Home Builders' Pages, where questions are answered. The people who follow those pages, and the number that does so is constantly increasing, are learning that it pays to secure the opinion of a disinterested architect or builder before buying. Even when they do not do that, they are apt to make a fetish of good construction.

And more than one man who has played the suckers is finding his property unsold because he dared too much.

Too many people hold the notion that a frame house is bound to be old in ten years, a notion that has been fostered by the man who skimps to the limit. For the good of the trade as a whole, this kind of work should be discouraged, boycotted, and the perpetrators brought into the fierce light of publicity.

Know good work and build in yourself the conviction that you *must* do good work. Have confidence in yourself and build up the confidence of others in you.

Building Activity Throughout the United States

Government restrictions on building went into effect during the last half of September. Therefore the influence of this curtailment is reflected slightly in the loss of 35 per cent for the country as a whole, 160 cities reporting; 103 of these cities report losses. The volume of construction for the entire country during September, 1918, was $21,441,372, as against the 1917 figure of $33,168,564.

Tacoma, Wash., reports "still building small homes. City's population increasing visibly every month." Kansas City, Kan., states, "No residence work at present; all factory additions." South Bend, Ind., reports "Building of local enterprise almost nil. Government housing loan is promised. Restrictions will affect us little if any." St. Paul, Minn., writes "Very few new buildings of importance. Alterations, repairs and garages constitute most of the work."

Taken as a whole, the various building departments seem to hold the opinion that construction is already at its lowest level and that Government restrictions will merely stop work which is more or less of an extravagance. Cities located near ship-building plants or essential business express little fear of serious interference with their needs, as local conditions have already favored essential work considerably at the expense of unimportant private work. Conversely, cities located in "peace sectors" fear practical elimination of new buildings. Farming districts will have little curtailment, for activity there will be the tendency, due to the essential nature of farm buildings together with the amendment that farm buildings costing not more than $1,000 in the aggregate, will be permitted to proceed without special license.

In summing up the situation throughout the country, eastern cities show a loss of 54 per cent, 19 out of 62 cities reporting gains; cities in the middle states report a loss of 48 per cent, 15 out of 47 reporting gains; southern cities show a gain of 17 per cent, with 14 out of 31 cities showing gains, and western cities show a gain of 18 per cent, 9 out of 20 cities reporting gains.

The figures in detail are as follows:

CITIES IN MIDDLE STATES

	September 1918				Septemer 1917			
	New Work		Repairs		New Work		Repairs	
	Permits	Value	Permits	Value	Permits	Value	Permits	Value
Akron, Ohio........	144	$329,925	64	$39,735	283	$1,084,015	108	$81,385
Canton, Ohio.......	19	48,150	36	24,640	18	28,350	...	....
Cedar Rapids, Iowa..	8	52,000	9	11,000	10	61,000	15	36,000
Chicago, Ill.......	200	2,447,600	...	....	321	4,334,400	...	....
Cincinnati, Ohio.....	54	86,185	140	84,720	134	574,030	277	163,831
Cleveland, Ohio.....	209	1,346,600	634	219,396	295	3,014,100	747	295,975
Columbus, Ohio.....	102	208,315	67	52,840	129	198,365	52	22,475
Davenport, Iowa....	82	105,553	...	....	68	68,015	...	....
Dayton, Ohio.......	155	400,312	...	....	94	98,262	...	....
Des Moines, Iowa...	67	1,033,400	...	....	42	72,025	...	....
Detroit, Mich.......	448	1,508,887	268	1,148,537	596	1,728,990	292	301,660
Dubuque, Iowa.....	5	13,130	...	....	16	28,525	...	....
Duluth, Minn.......	154	800,000	66	30,172	56	207,795	85	133,370
East St. Louis, Ill...	15	85,690	...	....	29	175,986	...	....
Ft. Wayne, Ind.....	11	32,125	11	24,350	60	162,760	3	351,200
Grand Rapids, Mich.	64	32,811	...	....	116	182,190	.	....
Indianapolis, Ind....	102	228,275	286	135,194	167	521,932	255	101,421
Joplin, Mo.........	12	25,755	4	1,130	26	49,672	4	1,350
Kansas City, Kan..	20	373,150	...	....	31	106,047	...	....
Kansas City, Mo....	213	$306,250	...	....	225	$343,280	...	....
Kalamazoo, Mich....	8	19,050	5	$4,100	11	57,850	5	$2,900
Lincoln, Neb........	44	126,960	...	....	34	124,855	...	....
Milwaukee, Wis.....	168	437,370	86	116,334	156	650,650	107	136,684
Decatur, Ill.........	22	64,496	5	7,000	34	238,900	5	2,450
Minneapolis, Minn...	332	373,855	...	....	506	799,785	...	....
Omaha, Neb........	98	175,682	...	....	75	756,640	...	....
Peoria, Ill..........	23	78,835	34	11,950	32	118,995	14	9,437
Saginaw, Mich......	42	49,533	...	....	25	26,973	...	....
St. Louis, Mo.......	168	146,510	239	159,895	264	533,110	348	325,052
St. Paul, Minn......	140	182,394	...	....	233	374,468	...	....
Sioux City. Iowa....	36	122,950	...	....	60	254,439	...	....
South Bend, Ind....	102	183,766	...	....	172	82,296	...	....
Springfield, Mo......	9	3,550	14	5,625	6	3,365	19	7,575
Springfield, Ill......	57	76,000	...	....	33	77,850	...	....
Superior, Wis........	89	39,685	...	....	97	39,157	...	....
Terre Haute, Ind....	28	27,967	13	4,110	15	110,963	19	8,005
Toledo, Ohio........	161	234,733	...	....	288	656,972	...	....
Topeka, Kans.......	11	5,785	6	5,519	14	185,485	5	4,495
Wichita, Kan.......	82	170,455	...	....	81	206,940	..	....
Youngstown, Ohio...	276	671,860	...	....	151	287,040	...	....
Hamilton, Ohio.....	21	22,900	12	6,526	4	10,000	13	6,099
Lansing, Mich......	18	11,525	5	1,960	26	14,710	...	....
Jackson, Mich......	42	336,790	...	....	44	38,574	...	....
Hot Springs, Ark....	9	15,000	3	1,500	25	60,000	8	4,800
Sioux Falls, S. D....	12	30,000	18	14,390	20	80,000	5	7,650
Richmond, Ind......	..	1,500	...	5,960	...	4,750	...	7,112
Joliet, Ill...........	7	27,500	...	....	10	37,500	...	....
	4089	$3,100,764	2025	$2,153,782	5132	$8,864,006	2286	$2,037,026

CITIES IN EASTERN STATES

	September 1918				September 1917			
	New Work		Repairs		New Work		Repairs	
	Permits	Value	Permits	Value	Pesmi	Value	Permits	Value
Albany, N. Y.......	110	$38,865	...	....	361	$1,165,400	...	....
Allentown, Pa.......	5	8,975	5	3,050	18	74,730	6	2,850
Altoona, Pa.........	10	11,485	37	10,240	8	4,175	35	12,699
Atlantic City, N. J..	4	15,685	38	21,597	9	14,468	61	18,501
Auburn, N. Y.......	11	23,765	...	....	17	13,925	...	....
Bayonne, N. J.......	26	53,570	...	....	13	21,680	...	....
Binghamton, N. Y...	62	20,322	76	11,423	71	30,735	136	31,372
Boston, Mass.......	47	202,205	367	236,546	64	820,410	306	495,866
Bridgeport, Conn....	108	509,845	...	....	130	615,147	...	....
Brockton, Mass.....	10	7,950	8	8,700	20	29,915	13	7,245
Buffalo, N. Y.......	216	395,500	61	87,500	276	1,074,000	...	....
Easton, Pa.........	7	39,720	5	4,400	6	7,250	11	7,000
East Orange, N. J...	21	41,932	...	....	34	88,238	...	....
Elisabeth, N. J......	32	132,877	...	....	35	82,620	...	....
Erie Pa............	82	258,005	33	132,943	108	166,983	...	....
Fitchburgh, Mass....	13	18,660	...	....	14	31,807	...	....
Harrisburg, Pa......	19	36,200	...	....	9	204,255	...	....
Hartford, Conn......	64	122,180	...	....	100	462,905	...	....
Hoboken, N. J......	5	58,200	6	3,700	10	20,125	15	13,750
Holyoke, Mass......	2	19,600	3	1,650	6	175,400	3	1,500
Lancaster, Pa.......	10	15,150	...	....	18	9,625	...	....
Lawrence, Mass.....	12	795,850	12	49,090	11	40,500	9	9,245
Manchester, N. H...	45	27,297	...	....	68	58,774	...	....
Camden, N. J.......	36	365,960	...	....	46	74,264	...	....
Danbury, Conn......	1	2,000	12	2,725	2	350	6	2,450
Newark, N. J.......	126	468,215	...	....	175	616,297	...	....
New Bedford, Mass..	43	69,600	...	....	46	113,275	...	....
New Britain, Conn..	34	62,000	20	25,325	22	108,750	25	6,725
New Haven, Conn....	57	178,400	37	25,515	217	2,741,879	...	....
New York..........	1512	3,610,918	...	....	1670	7,602,999	...	....
Manhattan.......	13	275,700	159	443,170	18	1,915,300	237	1,510,589
Bronx...........	9	135,600	94	124,956	23	193,600	170	108,713
Brooklyn.........	144	1,156,175	518	417,735	128	2,009,015	745	941,732
Queens...........	513	872,936	...	....	283	483,431	...	....
Richmond........	62	184,646	...	24,520	66	440,619	...	24,635
Niagara Falls, N. Y..	45	97,375	...	....	75	168,610	...	....
Passaic, N. J........	15	33,900	12	1,550	16	287,010	11	14,500
Paterson, N. J......	13	50,750	47	17,882	40	129,665	51	10,780
Philadelphia, Pa.....	187	770,890	237	291,310	578	2,852,765	...	....
Pittsburgh, Pa......	119	552,886	69	163,015	178	585,691	116	145,945
Portland, Me.	12	6,000	18	18,605	18	62,805	21	21,610
Quincy, Mass.	69	89,370	...	....	65	147,982	...	....
Reading, Pa.. ...	27	27,725	115	31,300	41	257,500	97	42,200
Rochester, N. Y.....	59	116,145	36	26,100	115	851,505	58	84,372
Schenectady, N. Y...	45	201,020	24	8,525	47	191,905	41	13,541
Scranton, Pa.... ..	16	66,675	...	....	32	123,303	...	....
Springfield, Mass....	71	134,880	...	....	106	180,255	...	....
Syracuse, N. Y......	45	35,660	59	43,495	99	242,716	64	87,186
Trenton, N. J	34	13,230	...	....	36	58,941	...	....
Lowell, Mass........	18	10,078	17	5,605	32	30,565	35	49,085
Troy, N. Y.........	27	16,735	...	....	38	195,180	...	....
Utica, N. Y.........	180	67,050	6	7,650	70	222,650	9	8,950
Waterbury, Conn....	113	335,335	...	....	164	285,100	...	....
Wilkes-Barre, Pa....	34	41,554	...	....	43	28,786	...	....
Worcester, Mass.....	76	150,805	...	....	136	247,793	...	....
York, Pa...........	35	31,852	...	....	40	59,403	...	....
Mount Vernon, N. Y.	11	18,020	11	3,075	18	49,768	16	4,300
Newport, R. I.......	49	118,386	184	101,777	99	175,050	129	83,670
Stamford, Conn.....	25	293,680	...	....	27	25,365	...	....
Providence, R. I.....	252	187,400	186	142,500	65	91,000	175	93,100
West Hoboken, N. J.	14	8,650	...	....	11	14,555	...	....
Yonkers, N. Y......	14	26,300	...	....	36	91,600	...	....
	5097	$3,739,839	2512	$2,524,179	6487	$9,989,287	2601	$3,854,081

CITIES IN SOUTHERN STATES

	September 1918				September 1917			
	New Work		Repairs		New Work		Repairs	
	Permits	Value	Permits	Value	Permits	Value	Permits	Value
Atlanta, Ga.........	20	$255,000	161	$122,690	50	$252,425	133	$34,783
Baltimore, Md......	133	430,634	...	....	181	230,130	...	....
Beaumont, Tex......	35	53,574	24	4,785	29	45,305	16	1,648
Birmingham, Ala....	231	457,900	...	....	417	137,316	...	....
Charlotte, N. C.....	10	18,600	11	54,875	19	17,290	...	....
Chattanooga, Tenn..	1	....	108	12,714	9	....	171	40,331
Dallas, Tex.........	6	9,000	18	30,262	15	56,150	29	25,065
Jacksonville, Fla....	22	63,700	23	10,860	9	3,175	31	19,680
Houston, Tex.......	90	176,275	160	29,125	50	194,121	114	16,909
Huntington, W. Va..	37	547,510	...	....	48	85,480	...	....
Louisville, Ky.......	30	56,365	39	18,680	56	54,500	34	26,190
Lexington, Ky......	37	6,925	...	....	28	17,515	...	....
Memphis, Tenn.....	6	9,775	35	14,260	27	139,670	30	32,125
Montgomery, Ala...	14	3,482	87	12,976	20	19,129	96	12,966
New Orleans, La....	62	220,830	...	....	53	86,386	...	....
Norfolk, Va.........	36	175,110	6	5,550	33	54,050	11	34,100
Richmond, Va......	12	147,616	51	137,954	28	65,611	57	30,169
San Antonio, Tex....	203	242,680	...	....	169	120,065	...	....
Savannah, Ga.......	19	11,135	...	....	26	22,240	...	....
Shreveport, La......	18	61,530	37	12,410	23	22,515	44	6,453
Fort Worth, Tex....	36	65,940	43	19,952	6	37,895	18	28,650
Tampa, Fla.........	12	2,095	35	12.780	14	52,575	45	7,371
Washington, D. C...	35	75,705	192	166,460	60	657,870	222	115,775
Wilmington, Del....	15	46,665	...	....	17	15,510	...	....
Wheeling, W. Va....	30	13,985	...	....	51	16,257	...	....
Corpus Christi, Tex..	6	850	...	....	5	1,855	...	....
Covington, Ky......	8	13,900	...	....	25	21,950	...	....
Knoxville, Tenn.....	9	24,900	52	29,589	9	285,400	95	17,704
Columbia, S. C......	58	314,607	564	79,000	115	345,848	686	118,817
Galveston, Tex......	388	15,286	...	....	179	16,531	...	....
Roanoke, Va........	16	7,152	...	....	30	17,255	...	....
	1635	$3,528,726	1646	$764,922	1772	$3,092,019	1831	$568,755

CITIES IN EXTREME WESTERN STATES

	September 1918				Septemer 1917			
	New Work		Repairs		New Work		Repairs	
	Permits	Value	Permits	Value	Permits	Value	Permits	Value
Berkeley, Cal.......	15	$45,100	57	$16,300	19	$30,400	63	$22,000
Colorado Spgs., Col..	6	1,575	10	21,800	7	1,299	8	2.700
Denver. Col........	74	110,000	90	45,850	107	570,660	77	83,750
Los Angeles, Cal....	263	575,896	257	148,195	287	510,032	218	103,833
Oakland, Cal.......	233	528,179	100	36,075	159	166,431	90	29,285
Pasadena, Cal......	26	14,978	35	18,573	27	41,930	69	32,270
Portland, Ore.......	349	339,536	254	136,415	114	105,705	151	76,580
Pueblo, Col........	37	10,124	...	....	26	13,440	...	....
Sacramento, Cal.....	58	91,583	...	....	94	103,174	...	....
Salt Lake City, Utah	56	183,750	...	....	93	335,500	...	....
San Diego, Cal......	79	39,316	...	....	107	55,203	...	....
San Francisco, Cal...	51	502,548	191	292,548	45	771,433	261	366,252
San Jose, Cal.......	23	42,931	...	....	23	72,955	...	....
Seattle, Wash.......	1458	1,402,510	...	....	740	441,800	...	....
Spokane, Wash......	48	21,305	39	6,993	59	173,970	42	26,280
Stockton, Cal.......	45	38,550	...	....	50	58,168	...	....
Tacoma, Wash......	256	171,080	117	55,187	44	51,380	52	50,920
Fresno, Cal.........	40	100,855	33	9,570	42	26,905	43	44,670
Long Beach, Cal....	318	491,298	...	....	76	61,848	...	....
Oklahoma City, Okla.	60	130,540	...	....	100	332,612	...	....
	3295	$4,841,654	1183	$787,506	2219	$3,924,842	1095	$838,548

BUILDING AN ADDITION 525 FEET HIGH

By building a 525 ft. addition to a nine story building, the architectural and engineering possibilities in remodeling and addition work were exemplified to a marked degree. The addition, which was added to the building of the Travelers' Insurance Co., Hartford, Conn., fits well into the architecture of the original building. Above the main cornice of the addition rises a tower 47 x 128 ft. in plan, becoming a square further up through a series of set-backs. The tower itself is 392 ft. above the building proper. Both building and tower are of skeleton steel construction faced with pink Westerly granite backed with brick. Throughout both the original building and the addition Excelsior wire lath was used as a plaster base. The architect was Donn Barber and the contractors were Marc Eidlitz & Son, all of New York City.

NOTICE TO SUBSCRIBERS

Difficulties encountered in effecting a settlement of a strike in our printing department have caused postponement in the mailing of this issue. Despite an agreement extending to March, 1919, our press feeders have arbitrarily demanded an increase in wages of approximately 25 per cent. We ask the indulgence of our readers for the delay which has caused this issue to be unduly late.

Correction in Government Restrictions on Buildings

In the editorial on "The Government Restricts Building," page 497 of the October issue, the second paragraph should have read, "The procedure that must be followed by a contractor who desires to start either an alteration job costing over $2,500 or a new project is as follows." A careful reading of the editorial, "How will the new restrictions affect building" on the same page will make clear just what the Government rulings are in respect to new and repair work. On page 498 the sentence "construction already under way will be allowed completion," should have had added the phrase "pending further action."

New Catalogs of Interest to the Trade

Letters on Wood Finishing.—Pratt & Lambert, Inc., Buffalo, N. Y. Gives valuable information concerning the different kinds of stain, how to obtain silver grey effects, dull finish on floors, exterior finishing, oil stains and paste fillers, mahogany effect on various woods, the finishing, oil stains and paste fillers, mahogany effect on various woods, the finishing of Philipine mahogany, the finishing of veneered woods, sugi finish on cypress, the finishing of white ash, finishing of rosewood, the proper use of paste filler, and other interesting information of a valuable nature.

Boss High Speed Concrete Mixers.—Catalog No. 18. The American Cement Machine Company, Keokuk, Iowa. Describes various types of concrete mixers, pavers hoists, back fillers, pumps, etc., manufactured by this company.

The Call for Colors.—H. S. Barber Cre-Sote-Stained Shingle Co., 173 Beaufait Avenue, Detroit, Mich. A folder describing these shingles, together with houses on which they were used.

Bishopric Board.—Bishopric Manufacturing Co., 913 Este Avenue, Cincinnati, Ohio. Booklet giving detail drawings showing how Bishopric Board is applied to columns, roofs, partitions, as base for stucco with sheathing omitted, cornice construction, ceiling construction, when used with brich veneer, etc. Detailed directions for applying stucco board and stucco specifications for use on the board. Results of Tests with Stucco Board, with and without sheathing. Photographic reproductions of houses in which this material has been used, and testimonials from contractors and builders. Plans and elevations of houses with comparative cost of stucco on hollow tile, common brick, holland brick, brick veneer, face brick, stucco on metal lath, shingles, clapboards, stucco on Bishopric Board.

Combined Brick Machines and Pug Mills.—The Bonnot Co., Canton, O. Catalog illustrates and describes combined brick machints of both single and double gear with a capacity of from 25,000 to 150,000 daily. Brick and Tile Cutters are also shown.

Auger Bricker Machines and Pug Mills.—The Bonnot Co., Canton, O. Describes and illustrates "Bonnot" brick dies, auger brick machines, hollow ware machines, single and double geared pug mills and also a regulating clay feeder.

Building More Comfort Into the Farm Home.—The Beaver Board Companies, 64 Beaver Rd., Buffalo, N. Y. Booklet treats with the improvement made by Beaver board in the farmers' home, whether it be newly constructed or "fixed up like new." Illustrates use of Beaver board in every farm building. Free paneling designs for various rooms may be had upon request.

Expanded Metal Construction.—Northwestern Expanded Metal Co., Chicago, Ill. The September issue of this monthly discusses in detail the durability of metal lath in buildings and in the construction of reinforced concrete ships.

Doorways.—Richards-Wilcox Mfg. Co., Aurora, Ill. The October issue describes the advantages of R.-W. hardware on elevator doors to prevent "preventable accidents." Describes and illustrates door checks, garage door hardware, wire stetchers, wagon jacks, wrenches and vices in addition to numerous door hardware appliances.

The Carter Times.—Carter White Lead Co., Chicago, Ill. The September issue treats in an interesting vein the subjects of linseed oil and the war, and wall painting. The "Paint Information Box" is an interesting feature of this issue.

The Dutch Boy Painter.—National Lead Co., New York. An interesting article on "House Painting" is contained in this issue. Interesting sales information and suggested window displays are features of this booklet.

Any of these catalogs will be furnished by the manufacturers. Or, if you prefer, we will see that you receive any that you desire. Just check the catalogs you want, tear out the page, and mail it to Building Age, 243 West 39th Street, New York.

Hydro-Carbonite — The Guaranteed Paint for Roofs and Iron.—Monarch Paint Co., Cleveland, O. Booklet describes and illustrates this roof paint made in black only. Details of its uses, application and covering capacity are also shown. Testimonials of users and details of mending cement are featured.

Coburn Round Trough Trolley Tracks and Door Hangers.—Coburn Trolley Track Mfg. Co., Holyoke, Mass. Booklet describes fully the company's manufacture of trolley tracks and door hangers. These include a barn door trolley track and hanger, school house door trolley track, garage door hanger and all appliances connected with door hardware.

Coburn Line of Improved Garage Door Hangers.—Coburn Trolley Track Mfg. Co., Holyoke, Mass. By plans, drawings, photographs and text, garage door hangers and the hardware needed are described. Specifications are given with an offer to furnish detailed drawings and specifications at any time upon request of prospective builders or architects on receipt of information of the conditions under which it is desired to use sliding door hardware.

The Easy Pipe Pusher.—The Easy Mfg. Co., David City, Neb. Pamphlet illustrates and describes in detail new method of laying pipe without digging up the entire street.

Turning Busy-Ness Into Business.—Screw Machine Products Corp., Providence, R. I. Describes operation of the Select-o-Phone an automatic interior phone service which saves time and money to the busy executive. By illustration and photographs, a comparison is made between the old system and the proposed automatic switchboard to the advantage of the latter.

"Anti-Hydro." — Anti-Hydro Waterproofing Co., 149 Broadway, New York City. Catalog describes a liquid making all kinds of concrete mixtures waterproof, dampproof and is also a concrete hardener.

The Matchless Kitchen.—Edison Electric Appliance Co., Inc., New York. The "electric" kitchen is described to advantage as safe, sanitary and saving to the housewife. By the operation of the electric range, oven and broiler, cookers and water heater, an "electric" kitchen is complete and a matchless kitchen is the result.

Perforated Sheet Metal.—Beckley Perforating Co., Garwood, N. J. Shows some of the different sizes of perforation and different kinds of screens made by this company for all uses.

Martin Portable Vice Stand and Pipe Bender.—H. P. Martin & Sons, Owensboro, Ky. Some of the advantages set forth for this product are that it holds while you cut or thread, bends the pipe without kinking, stands without hitching and is portable. Testimonials of pleased users are also shown.

Lighting and Ventilation of Modern Buildings.—J. G. Wilson Co., 8 W. 40th St., New York. By the use of diffuselite blinds and paints the hospital wards and sick room's lighting has been bettered. This bulletin treats with the subject of lighting in a scientific and interesting fashion.

Cabot's Quilt.—Samuel Cabot, Inc., Boston, Mass. Describes and illustrates "quilt" as a scientifically-constructed lining for making houses warm in winter and cool in summer, for deadening sound in floors and partitions, for insulating cold stores, refrigerators, icehouses, etc. By tests, illustrations and testimonials, booklet shows value of Cabot's Quilts. Shows advantages in schoolhouses as a sound deafener and as a fire protection.

Auger Machines for the Stiff-Mud Process.—J. D. Fate Co., Plymouth, O. Describes and illustrates combined pug mill machines each equipped with double shafts or knives.

Now is the time to talk over the Barn-Door Question

Last month we showed you our improved "BIG FOUR" HANGER

Now we will show you the National No. 77 FLEXIBLE STORM-PROOF DOOR HANGER

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A glance at any barn door hung with this practical hanger shows that it is carried closer to the rail than is possible with any other adjustable hanger.

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National Storm-Proof Rail comes in 4, 6, 8 and 10-ft. lengths, two pieces of a length, both cover and rail, packed in a bundle.

Corners and edges are fully protected and cannot get bent in shipping.

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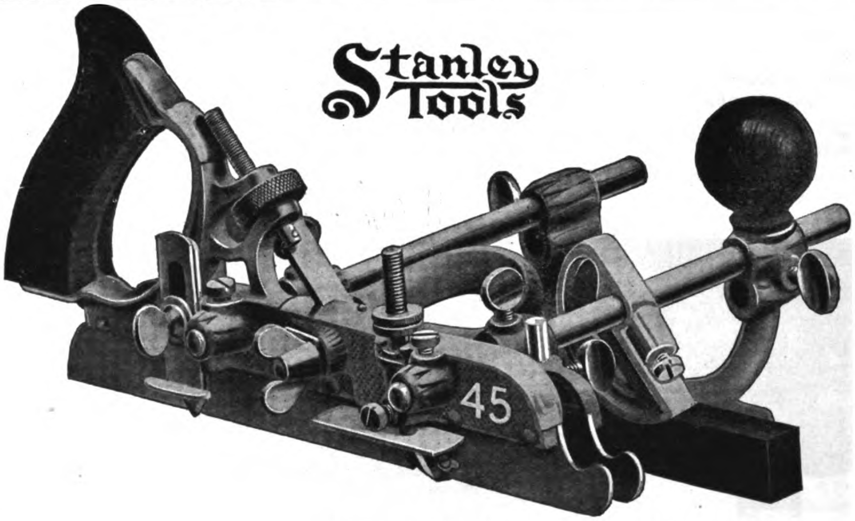

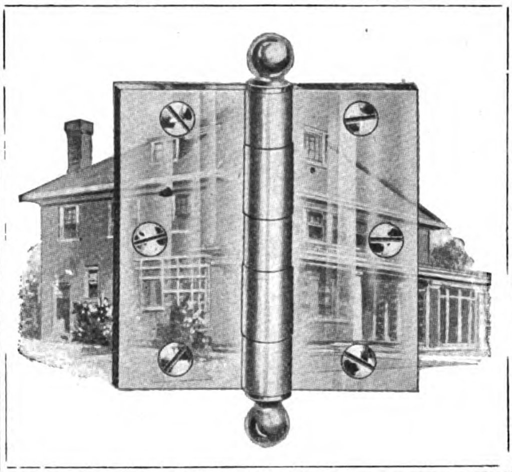

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is designed along lines that insure both *beauty* to the home and *service* whenever the doors are opened and closed.

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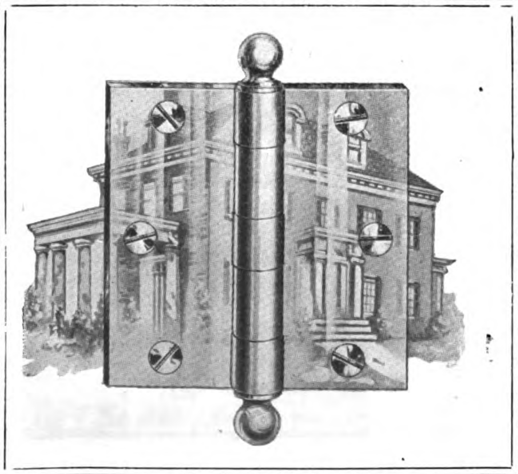

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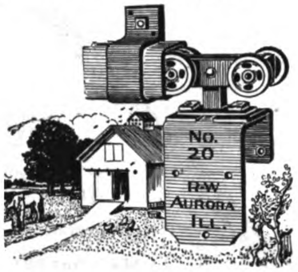
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The Pamphlet and the Mounted Model Hanger will be mailed on request.

SOMETHING FOR US. We ask your special attention to items 5, 6, 7 on page 5 of the Pamphlet and to the matter on pages 23 and 24 relating thereto.

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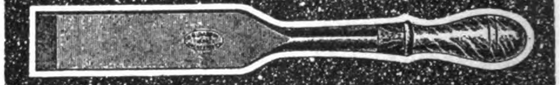

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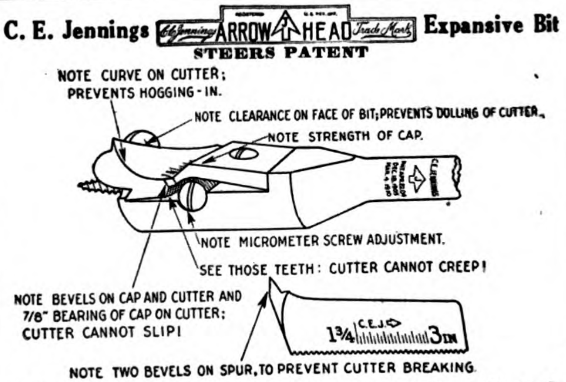

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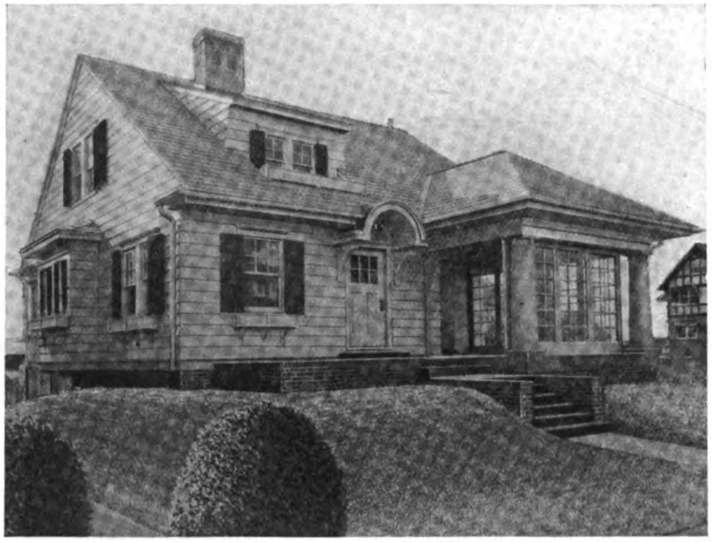
BUILDING AGE

New York, December, 1918

An Attractive Suburban House Built at Atlantic City, N. J.

Design Simply and Effectively Handled—Two Bedrooms and Bath on the First Floor a Feature

One of the most prominent features of this house is the porch at the left. Jutting out as it does from the rest of the house, it forms a pleasant addition by reason of the fact that one can view the entire street from it. As it is enclosed in glass by removable sash, it is as readily usable in winter as in summer time; a radiator placed against the house wall helps make the porch livable the whole year round.



The circular hood over the doorway lends a novel but interesting touch of unusualness in this type of house.

This design is sufficiently unusual to immediately attract the passer-by

The second story dormer is well proportioned and scales in well with the rest of the house.

The front door opens directly into the living room, the main feature of which is a large brick fireplace, flanked on either side by built-in bookcases. Two radiators are placed in the room so that it may be kept comfortable in the most severe weather.

The electric fixtures in the living room are well placed, three wall fixtures being used. Furthermore, a floor plug permits a table lamp to be connected, thus securing convenience to a reader. Such a floor plug is a convenience not generally installed, with the result that there is often no place where a man can get good light to read by. Wall fixtures, such as are here used, help to provide good reading light.

At the left of the living room fireplace is an entrance to the dining room. This room has a bay window as its main feature. The radiator placed under this seat, a usual practice, is not nearly so efficient as it would be if placed elsewhere, for a radiator depends on the free circulation of air around it for maximum efficiency. In this present case, however, this placing could not well have been avoided. Both central and wall light fixtures are provided in this room.

The kitchen is reached through a small pantry containing a built-in dresser. This pantry is so placed that one cannot look from the dining room into the kitchen, an important feature often overlooked.

The manner in which the two first floor bedrooms are shut off from the living and service parts of the house is worthy of notice. Hall and stair space is used economically.

The tendency to-day is toward ever better sanitary conveniences. The larger and more successful hotels provide each room with a private bath, apartments are following the same plan as nearly as is practicable, and even the small country house of six and seven rooms is having space devoted to two or more bathrooms. This is as it should be, and the house planned in recognition of this tendency stands out from its fellows and is thus more easily rented or sold if the owner should ever desire that.

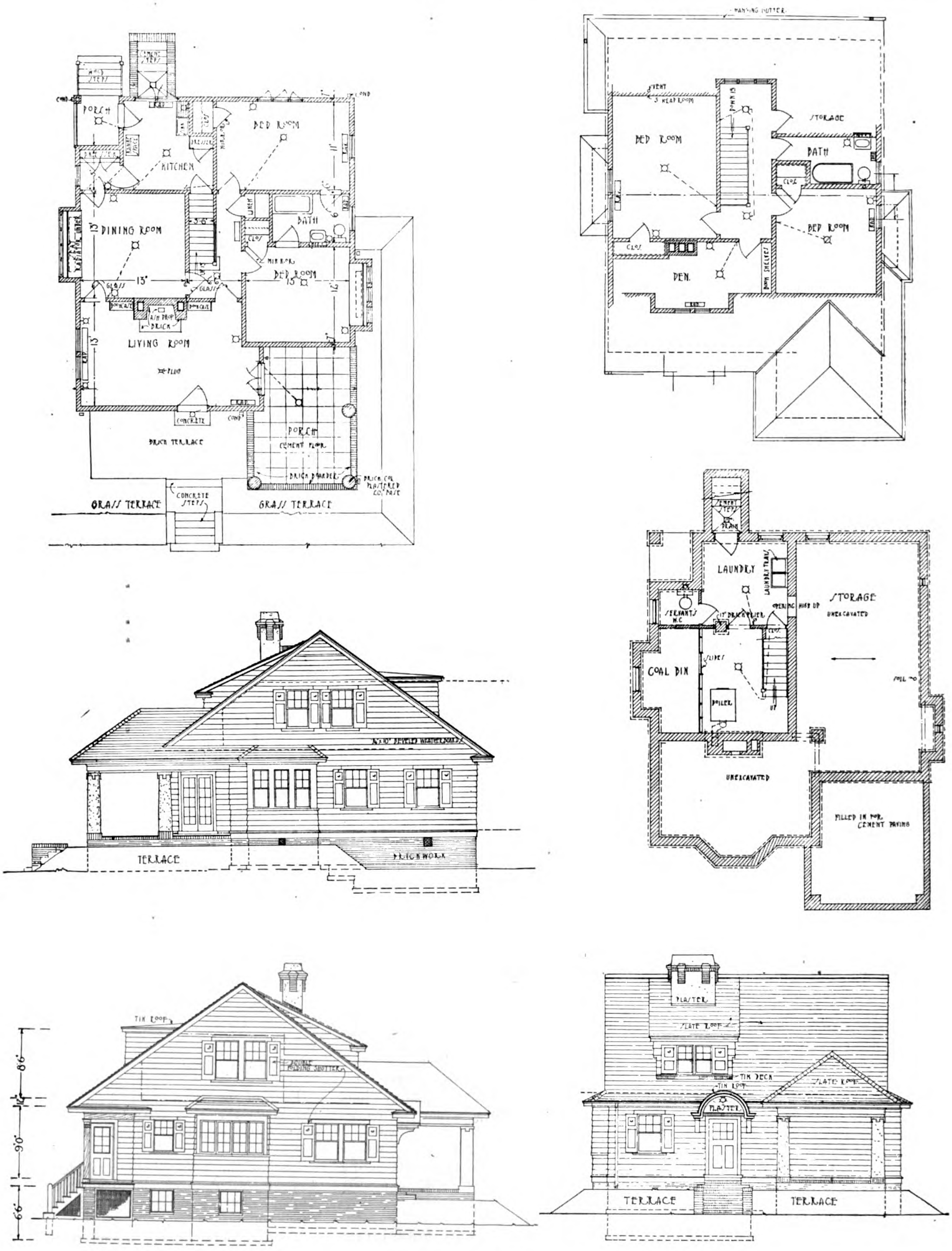
The two bathrooms in the Smathers house are placed with regard to both owner's and guest's convenience. That on the first floor, where naturally the two adjoining bedrooms would be used by the family, can be entered from either room, but is shut off from the hall. This space towards the hall is efficiently used as a linen closet and a bedroom closet. The second story bathroom can only be entered from the hall, thus being more suitable for guests' use, as guests would naturally be lodged on the second floor in this house.

The sun porch, enclosed in glass, is a popular feature

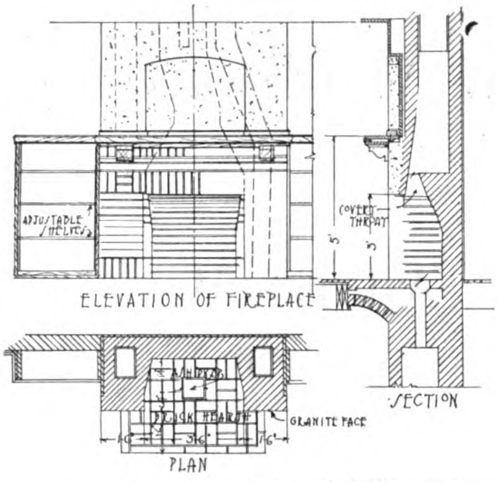
Each of the second story bedrooms has the large closet so dear to the average housewife. Ample storage space is provided.

Each of the bathrooms is provided with electric wall fixtures placed alongside of the wash basin, thus providing good light when shaving.

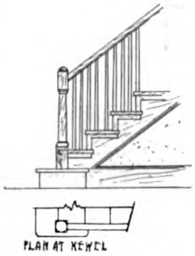
The bedrooms on the second story are provided with both central and wall lighting fixtures. This matter of bedroom wall fixtures is one often overlooked.



Floor Plans and Elevations
Scale 1/16" = 1'



Elevation, plan and section of fireplace



Detail of Stair

Rear elevation, scale 1/16" = 1 ft.

They are, however, a decided convenience, especially when placed so that a dresser can be put directly to one side or under them. In this connection, a fixture on either side of the dresser or dressing table is often advocated.

Hall fixtures, it will be noted, are placed so as to light the stairs.

The cellar is only partially excavated, merely necessary space being provided. This is the general tendency in small houses of to-day, as it cuts the cost of the finished structure considerably. The objection that the first floor is likely to be damp or musty can be entirely overcome by placing waterproof paper between the rough and finished floors of the first story. This effectively prevents the trouble.

This house was built for Mr. William Smathers at Atlantic City, N. J., in accordance with plans and specifications prepared by J. Fletcher Street, Architect, Drexel Building, Philadelphia, Pa.

What Zinc Is Used For in the Building Trades

Difference Between Various Qualities Governs Use—Soldering of Zinc

By J. A. Singmaster

A great many people associate the word "zinc" with a cast rod commonly used in electrical batteries. This product is brittle and crystalline and can be readily broken. They do not know that zinc is rolled and that in this shape it is remarkably ductile and tough. It is extremely resistant to atmospheric corrosion and, in view of these qualities, has found a tremendous application in the building trades in Europe. It displaces the more expensive metals, such as copper and lead, for roofing, flashing, spouting and guttering, with no sacrifice of durability and at considerable saving in first cost. Tin and terne-plate and galvanized iron, which we so commonly use for exterior work, are usually cheaper in first cost, but when length of life, cost of painting and replacement are taken into account, they are more expensive for permanent construction.

Rolled zinc is now largely used in this country in the manufacture of so-called "leaded" glass where rolled zinc sections of any desired shape support the glass. This zinc often is given the lead finish desired for architectural effect, and is much stiffer and more durable than the metal it has replaced. It is also made in the shape of shingles or tile, which can be treated to give most artistic effects, possessing the great advantage of permanence and unbreakability. Spouting and guttering of zinc have artistic possibilities, and in addition the owner will not be able to poke his finger through the leaders on his house at the end of three or four years, nor will he have to continually paint them.

Rolled zinc is also used largely in this country for weather-strips where permanency and ultimate cost are a consideration. It has, of course, been used for years in fastening glass in wooden frames in the shape of the familiar glaziers' "points."

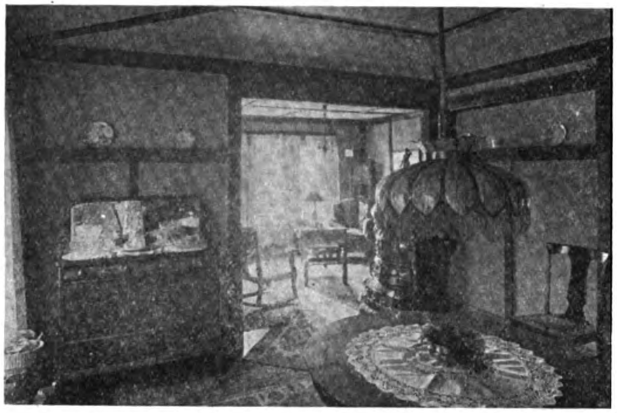
The use of zinc demands a certain familiarity with the metal which can be had with a little practice, and the selection of the proper quality of material for any given application. Zinc can be hard, medium hard and soft rolled. Hard rolled zinc would not stand bending for seam work, while soft metal can be drawn, bent and spun into the greatest variety of shapes. One of the great drawbacks to its use in the past has been the lack of appreciation of this point. No one using brass sheet would think of ordering it without specifying the kind of brass, yet ordinary zinc sheet is expected, when bought from a dealer, to meet any and every use, without due consideration of its physical properties.

A popular misapprehension exists regarding the soldering of zinc, numerous statements having appeared regarding the solution of this supposedly difficult problem. On the contrary, zinc is one of the easiest soldered metals. Anyone desiring to inspect a soldered joint can do so by removing the paper or cardboard cover from an ordinary dry battery cell, such as is used for operating door-bells, all dry battery cells being contained in soldered zinc cans.

A large expansion in the use of zinc in the building trades is certain to come here as it has come in Europe. Those who first take advantage of this development, and familiarize themselves with the possibilities and uses of zinc, will reap the benefits which have repeatedly come to those in every branch of industry who have studied and applied foreign improvements to American practice.

How Wallboard Was An Old

A Typical House Brought Space Livable and



Dining room which was remodeled by means of wallboard.

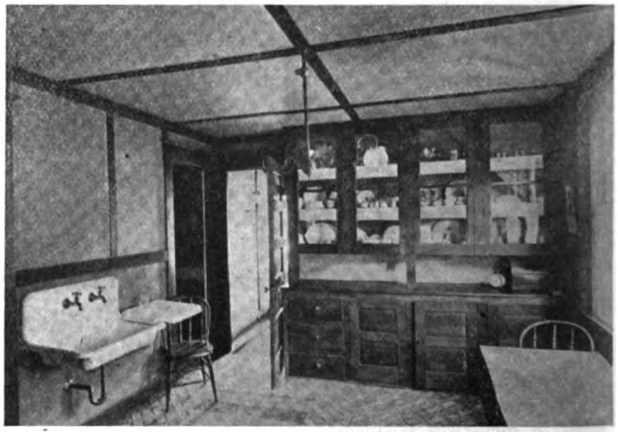
The illustrations show two lines of repair and remodeling work which not only are permissable but clearly desirable at this time.

The house illustrated on this page was one of the common "story and a half" houses which were built in large numbers some 15 or 20 years ago. They were usually sold with only the downstairs finished and the upper floor was left to the owner to be used as he pleased. Unfortunately, the owner usually pleased to let it alone except as a handy place for the accumulation of old trash.

This was the history of Mr. McDonald's second floor for many years until rising taxes and high living costs led him to figure what he could do with the unproductive space upstairs. Finally he decided to partition it off into rooms, using wallboard for the walls and ceilings. He found he could easily have enough rooms built in for an entire flat and rent it to a small family. When the work was finished it had cost him less than $750 and he had a cozy, up-to-date flat that was bringing him a return of $14 a month or $168 a year, which of course was a great deal more than his savings could earn in the bank.

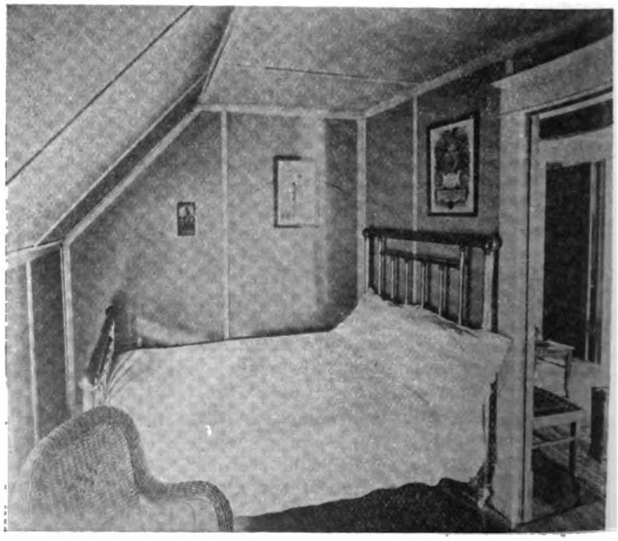
The utilization of the "half story" of houses of this kind will go a long way toward remedying housing problems which have become so vital not only in large manufacturing centers, but also in the small town and on the farm. Many an industrial worker or farm hand would be only too glad to find a pleasant, comfortable dwelling place like this with its attractive rooms and moderate rental.

If the old home does not have enough



Wallboard was used in the kitchen. It makes an attractive finish in such rooms and is entirely sanitary

Exterior of the home, which is just of average type.

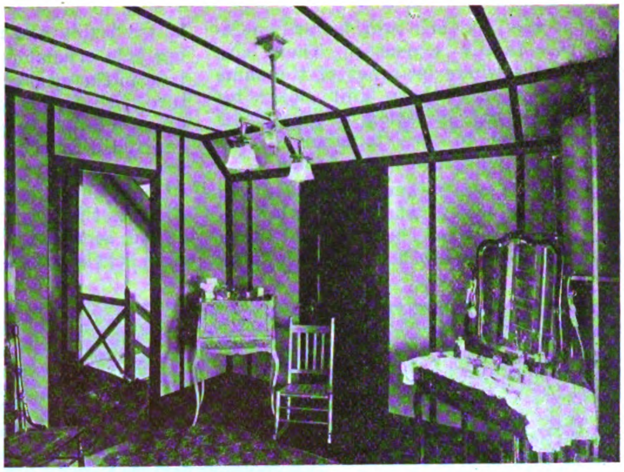


A bedroom was placed up in the attic and made livable in spite of the sloping roof.

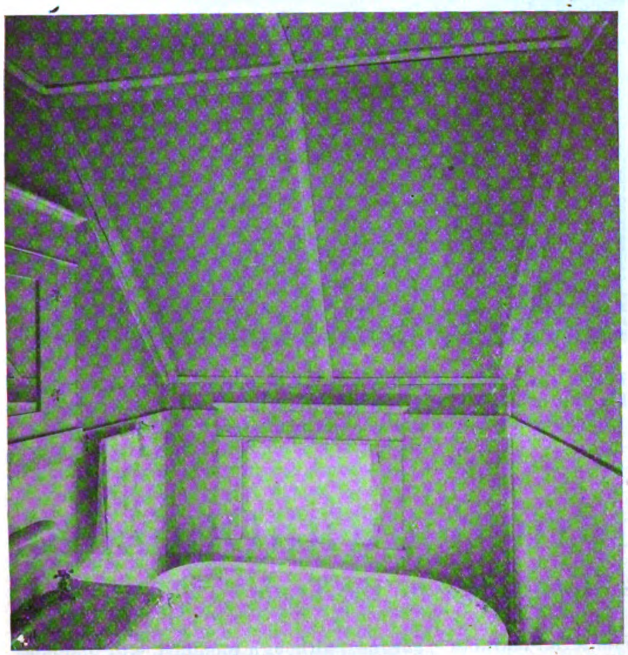
Used in Remodeling Home

Up-to-date—Making Attic Attractive

By L. H. Harvy



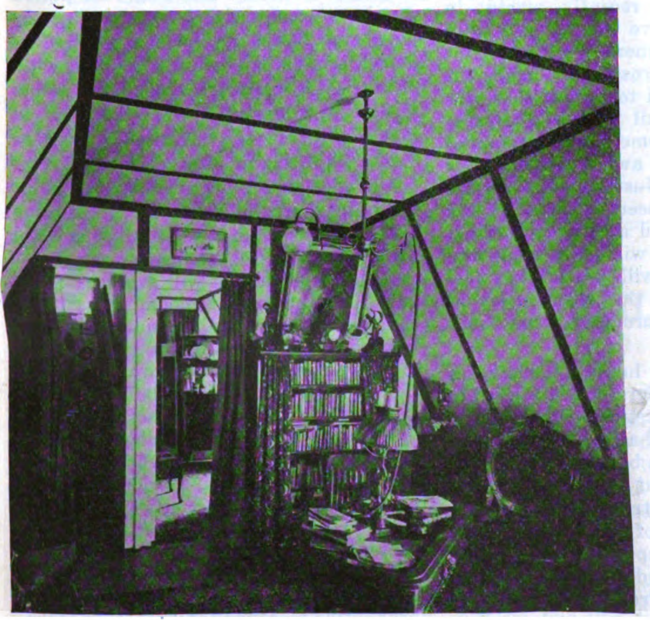
At the head of the attic stairs a large bedroom was made attractive by the use of wallboard.



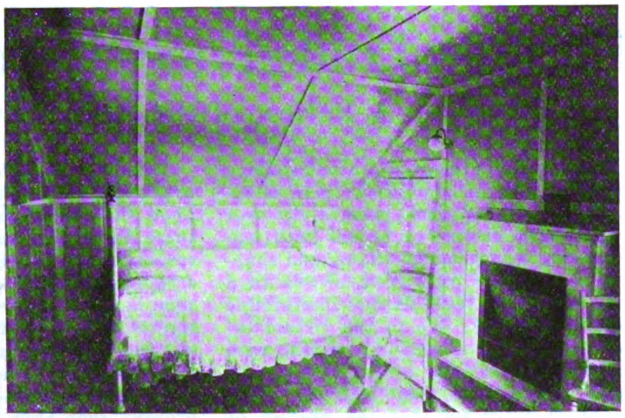
The bathroom. Note how well wallboard lends itself to attractive paneling designs where the ceiling must slope due to a slanting roof.

vacant space to provide dwelling quarters for a whole family, there is hardly an attic that cannot be made to furnish at least one inviting room which could be rented. The group of attic interiors shows what has been accomplished in several ordinary attics. These are not shown as examples of high-class design or workmanship but simply to point out how readily the attic of emptiness can be changed into rooms of good cheer.

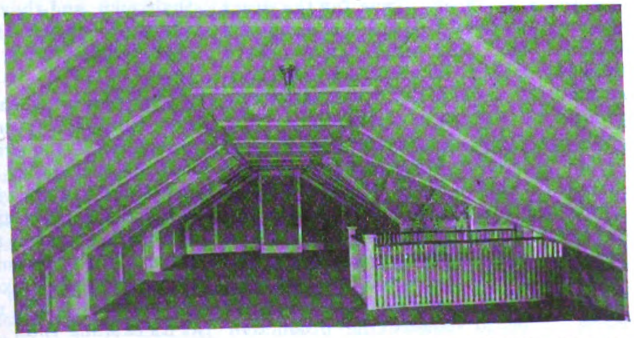
Then there is the family whose home circle has been shortened by the draft. Possibly an extra room or two, if rented, would offset the income that the son or



An attic library that took the place of waste space.



A bedroom in the attic.



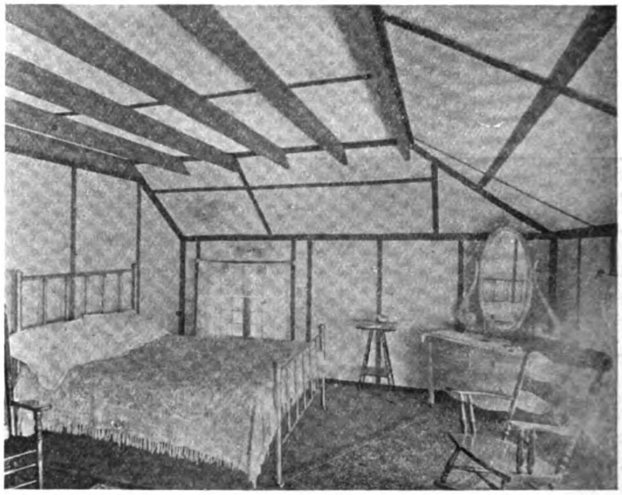
An attic which was made attractive in spite of difficulties in height.

brother used to turn over toward meeting the family expenses. There are other cases where branches of the same family who have been knit closer together by the operation of the draft would decide to live together if the house only had a few extra rooms.

While this article has dwelt upon two particular kinds of waste space utilization, emphasis has been placed upon them merely to show how such work can be profitably and rightly carried on during this crucial period. This is equally true in the case of the commercial structure with rooms that have not been kept up to present-day standards. There is no excuse for a building falling into disuse because of poor walls and ceilings. Often a permanent refinishing with wallboard is the only change needed to place an old, seemingly worn out building on a good service basis once more.

Reconstruction work of this nature has never occurred to many property owners. Getting such business may necessitate a little investigation and explanation. But it is so obviously practical and it can be handled so well with wallboard, which is generally available even where other materials are scarce, that both dealers and contractors will find it well worth while to talk up such reconstruction business.

A large room was possible in this attic. It seems a pity to waste attic space in a home when such results as this can be obtained.



In this case, the rough joists were left to form an unusual finish for the ceiling. Beam ceilings like this are popular in many localities; this particular treatment is out of the ordinary.

Lumber Trade Faces Reconstruction with Optimism

A Review of the Past Month's Happenings in the Trade

Trade reports received present varying aspects. On the one hand, there is repression, conservatism, uncertainty over prices, cancellations of orders with maneuvering to get out of others, and shaping of plans to pass from a war to a peace basis, but these factors intermingle with cheerfulness due to the virtual establishment of the world's freedom, with satisfaction over the lifting of long-imposed restrictions, as well as with tempered optimism that the process of switching from an all war-work program to normal activities will go forward with a minimum of shock. Thus far the great momentum attained by the war-propelled machine has prevented any abrupt changes. Indeed, building, and the lumber industry display the beneficial effects of partially abrogated restrictions.

The readjustment of labor shapes up as a huge problem. Sixty-five per cent of labor is in war work at present, so it is self-evident from this alone, that putting business back on a "business" basis is a huge problem. As to prices dealers believe the present prices will hold up well and there will be no substantial drop in prices. How to balance the production with the demand is another "nut to crack."

Although the building material markets are experiencing a slight improvement upon the conditions recently current in these lines they have not as yet fully responded to the general feeling of increased business prospects. Sufficient time has not elapsed to permit these interests to feel the full force of the present conditions, as some time is required to prepare plans and award contracts for new construction. Just as soon as the projects that have been released by the War Industries Board are ready to start the building markets will again come into their own, and they will immediately feel the full effects of the resumption of structural activity throughout the country.

The status of the lumber industry is now more clearly understood in regard to the effect of the armistice with Germany and the probability of a final peace. During a period that will be required in concluding difficulties that may confront the nations involved in a treaty of peace, the present war program of the United States with the possible exception of such work as munitions, will undobutedly continue at its existing rate. Present lumber rules and regulations, therefore, such as curtailed production, fixed prices and embargoes, although modified, will undoubtedly remain in effect during that period. At the present writing the existing embargo on forest products has been removed and shipments may proceed without securing permits except where shipments are destined for delivery at stations within the jurisdiction of New York, Philadelphia and Baltimore. Priority and preference regulations must be maintained in order to prevent unnecessary discrimination against the war program. The Government's program of building construction will eventually end, but the anticipated boom in general structural work and including a large volume of residential building in all parts of the country, should more that offset the stoppage of federal building. Materials for building purposes, for which there will be a tremendous post-war demand, will undoubtedly gather momentum in both demand and price during the next few months. Permits are reported to be free, with general satisfaction expressed by the trade that the embargo of Sept. 16, which has since been partially canceled, was a controlling and not a prohibitive measure. All together optimism is the spirit of the hour.

Quick Method of Setting Door Grounds

A Kink That Will Result in a Quicker and Neater Job Than Will the Usual Method

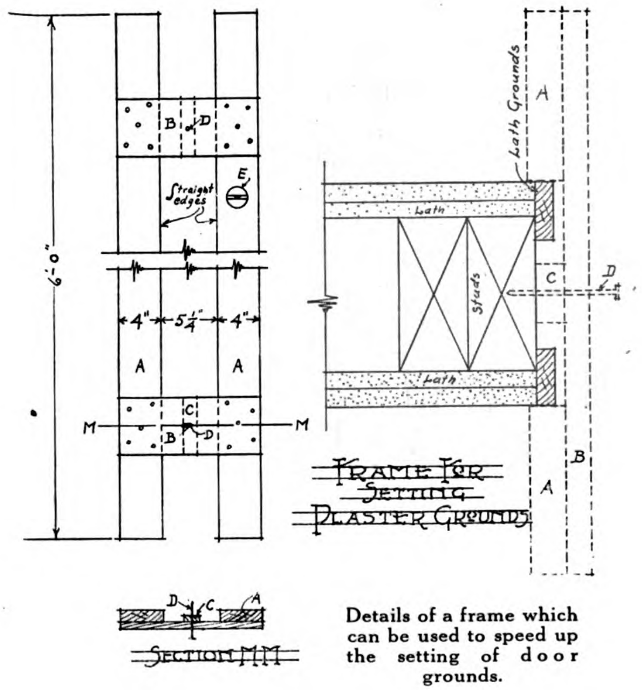
By Thorwald Thorson, Architect

It has interested me for some time to study what makes the real difference between a well-built and a poorly-built house as these terms are commonly used. Good or poor materials may have something to do with the result, but I am becoming convinced that most of our bad jobs are made from good materials and may even have good finished workmanship. There is nothing about the interior finish of a house that gives the impression of cheap shoddy construction more quickly than casings which do not fit to the plastered walls, or where the casings appear warped and out of line with the wall. This, in nearly every case, is not due to poor carpenter work or bad plastering, but to the failure to put on grounds before plastering. These should be put on by the carpenter, but as this work comes between that of the lather and plasterer when no other inside carpenter work is under way, it is very commonly neglected. This is the poorest kind of economy for the carpenter, as he usually spends several times as much labor in fitting jambs and casings as he would for placing grounds, and gets a second rate job even with the best possible workmanship.

I am illustrating a method of placing door grounds which can be done very quickly and accurately at practically no cost for materials. Make a frame of two pieces of straight edged 1 in. x 4 in., 6 ft. long, marked A, held together by two cross pieces B. The spacing should be accurate and should be the exact width of the finished jamb, which is usually 5¼ in. for a partition of 2 in. x 4 in. measuring 3⅝ in. The small blocks C, about ⅝ in. thick, are nailed on, and two nails D, partly driven in, complete the apparatus. A spirit level glass may be set as at E, or if this is not used the ordinary plumb may be used on the straight edges. This level should never be set in the cross pieces B, for the least loosening and sagging at the corners will make it incorrect.

To use this frame set it against the side of the opening, as shown by dotted lines in Fig. 2. Set by plumb and tack lightly in place with nails D. Laths are then slipped in and nailed in place to fit the frame. Repeat on other side and place laths at top to line with sides.

Note that these grounds are automatically plumb, straight and of even jamb width regardless of whether the jamb stud is straight or set out of plumb. If economy is necessary, the laths may be pulled off and used for other purposes after plastering is done. With this method the jamb widths will be constant so that it will not be necessary to wait for getting out the jambs until measurements are taken on the job, as is quite usual. Carpenters who have not tried the above method will be surprised at how rapidly this work can be done, and will be pleased to find how perfectly their jambs and casings will fit.



Details of a frame which can be used to speed up the setting of door grounds.

Bin for Soiled Laundry

By Henry Simon

Bins are usually thought of only in connection with flour, sugar and other articles of food, but a large tilting bin is the best of all devices for collecting and keeping soiled laundry in the household.

It is possible to build such a bin by itself, merely enclosing it in a box-like frame, but the best way is to make it part of a built-in cupboard or clothes-press located on a screen-porch, kitchen-porch or some other easily accessible place located close to where the laundering is done.

A convenient size is 12 in. deep by 24 in. high and 30 in. wide (outside measurements), though these measurements may of course be varied more or less, according to the size of the household and the available space.

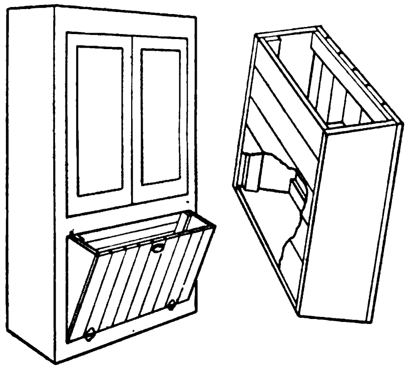
In building the bin the first thing to do is to cut out the sides from 12-in.

board, cutting them square at the bottom and at the top at a bevel, which will permit the bin to be pulled out almost, but not quite, to its full capacity, so that it can never accidentally fall out. To the inside of each side and ¾ in. away from its back edge is nailed a cleat ending ¾ in. from the bottom edge, the cleats thus forming rabbets for receiving the ends of the ceiling boards used to form the back, which are now nailed in place.

The front is now made of pieces of ceiling nailed on to two cleats of a length equal to that of the back boards, the top cleat being flush with the upper edge of the box, while the bottom cleat is set back ¾ in. in order to permit the bottom to be set in. The bottom, made of one piece of 12-in. board, is thus overlapped by both sides and the front, which latter shows ceiling only.

A pair of butterfly hinges is sufficient to hold the pin at the bottom, while a drawer-pull furnishes a convenient handle. If the bin is to be kept open occasionally for any length of time, a nail fitting a hole on the upper edge of one of the sides and hung from a short string fastened to the inside of the bin may be employed.

One great advantage of such a bin is that it takes up less floor space than any box, chest or drawer of anything like the same capacity. Even when opened to its extreme limit, the bin projects into the room only 22 in., while a drawer of the same capacity and opened would take up close to 4 ft. The bin can therefore be used in many places where a drawer or a box could not be employed at all, which is an important point in many small households, where space is contracted anyway. In addition, the bin is far superior to a drawer and a box with a lid both in the ease with which it is operated and in that the bin can be crammed full to its utmost capacity and still work easy. The placing of things into the bin again is extremely easy and convenient, for until it is quite full the laundry can simply be dropped into it, the bin closing itself automatically. And, finally, the bin has the decided advantage that it will never bind, jam or work hard.



A tilting bin that can be used for soiled laundry. This is a labor-saving convenience that the housewife will appreciate.

How to Prime and Paint Common Woods on the Market To-day

Methods of Overcoming Usual Difficulties Met With.

By A. Ashmun Kelly

Formerly there was but one wood to paint, and that a wood that took paint very kindly. To-day we use several woods in construction, and nearly all differ in their receptivity of paint. Hence it is well to understand this fact, and to know exactly what treatment each wood requires for successful use.

The true white pine may be first-coated, or primed, as it is called, with white lead thinned with raw linseed oil and a little japan driers. Some use a mixture of turpentine and oil in about the proportion of 80 or 90 per cent of oil to 20 or 10 per cent of turpentine.

The only advantage with the use of turpentine lies in the fact that it assists penetration. This is necessary only when the wood may be damp, then the turpentine, which will mix with water, while oil will not, overcomes the dampness and takes the paint down into the pores of the wood. The priming coat should be nearly all thinners, very little lead being needed. The practice with experts differs, as methods differ with all workmen; some prime with the pure oil alone, others with some lead in the oil. The amount of lead varies, some using a thin, others a comparatively heavy priming coat. One other virtue that turpentine possesses is its lower cost than the oil; hence when we can use it in paint it is that much gained.

Bass (linden wood) is much like white pine as to its action with paint, and should be primed the same. It is being much used now for exterior structural work, it being straight of grain, compact, light of weight, soft but tough, but not so durable as white pine, and also is not easily seasoned. A little turpentine in the priming is well with this wood, the paint being mixed thin, with very little driers—none at all when the weather is dry and warm. This permits more time for the paint to get into the wood before it sets up. The paint dries very satisfactorily on this wood, and owing to its light color two-coat work looks better than three does on darker woods. As regards both bass and white pine, the priming should be liberally flowed on and be well brushed into the wood.

Yellow or hard pine is a very difficult wood to treat with paint and requires very special treatment. There is a large number of pines used for building purposes, but that which we now have in mind is the hard resinous southern pine, and which has been used in house building for years, though it is only within recent years that it has been painted. First of all it is well to allow the wood to stand to the weather for some time, two or three weeks at least. If it is warm weather then much of its free pitch will come to the surface, then it may be roughly scraped off. The pores, too, will have opened out, the wood will have become dry, and the sappy parts bleached out. It has been found that the addition of a little pine tar to the priming coat will prevent any scaling, a southern painter's discovery; they recommend about one part pine tar to seven parts paint. The priming paint is made from white lead, thinned with raw linseed oil, with the pine tar added. Some experts say that considerable turpentine ought to be used in the priming coat, the amount varying with the character of the lumber, and may be anywhere from 25 to 40 per cent of total amount of the thinners used. Use turpentine freely with hard pine, they say. Brush the paint well into the wood, and do not allow the brush to slip over any hard places. See that not too much priming is left on those hard places.

Some painters have advised one or even two coats of shellac to keep back the sap and give a good foundation for the finish coats. There are at least two reasons against this practice, namely: High cost and scarcity of shellac, and the fact that by placing a barrier of shellac between wood and paint you shut out the paint from the wood, which it should protect from dampness, and allow the dampness to attack on both sides of the shellac, for shellac is not proof against dampness.

Now, if the object is to kill the sap, better use the gasoline torch and burn the sap out. This is just what we do when the wood has not stood to the weather as described. The sap is then scraped off and the wood primed. In this case the paint should be made from either all red lead or half and half of red and white lead, thinning with nearly all turpentine, using only a little oil. Red lead and white lead, too, dries readily without the assistance of japan. One painter makes a good suggestion, namely, to give the raw wood a coat of benzine, though we would prefer benzol, which is efficient in softening up the gum besides penetrating well into the wood.

Such treated surface should stand some time before priming. A priming coat of all red lead is apt to cause peeling of subsequent coat unless extremely little of the lead remains on the surface. It forms a very hard surface.

Usually the heart wood of trees takes paint better than the sap wood, but hard pine does not conform to this rule, forming an exception. The sap wood of hard pine taking paint better than the heart, and being cheaper also, it is strange that so many southern architects specify the latter wood for house siding, even for the best class of houses.

The far western pine woods, like those of Oregon and Idaho, for instance, are best primed with a paint thinned with a rather large proportion of oil, say about 55 per cent. But the use of benzol as well as of turpentine, is indicated in connection with the oil. Such woods possess very poor absorptive qualities, and the absorption is also uneven, quick on the softer parts, and slow on the harder parts.

Cypress is one of our best woods for exterior work, and much used for interior as well. It is classed with the soft woods, its character not being much unlike white cedar, grain straight, wood light in weight and strong and very durable. It should have the priming coat as soon as possible after leaving the plane, or before the grain rises. Make the priming coat from white lead thinned with turpentine, raw oil and a little japan drier. The addition of about one pint of benzol to the gallon of mixed paint, replacing an equal quantity of turpentine, will do good. Some painters use japan drier alone for the priming coat to make a surface for the paint. Some thin the white lead with benzol entirely. Each system has merit. If only oil is used in the priming the result will show in streaks, dry and wet. This because the wood is hard and soft, and the oil will not easily dry on the hard parts. I have had oil priming remain undry a week on this wood, where the same paint dried over night on old work beside it. After the priming apply two or more coats of white lead paint, each coat containing some turpentine, but no benzol, as it will soften up the under coat. Remember this fact in painting over any kind of painted surface. Benzol is a strong solvent of oil.

Do not cause the priming coat on cypress to dry quickly, but allow it time to soak into the wood. Second and third coats on cypress should be mixed rather stiff, but be well brushed in.

California redwood is another hard one to paint. It is because of its unevenness, soft and hard parts, the heart growth hard and resinous, not taking paint well, while its sap part is soft. Its priming and painting is much the same, very little oil but plenty of turpentine and benzol. A good formula is this: Raw oil, 70 per cent; turpentine, 30 per cent, with a half-pint of benzol to the gallon of mixed primer. A thin primer, well rubbed into the grain of the wood, is indicated. Never add benzol to any paint until you are about ready to apply the paint.

Poplar wood is another useful building wood. The wood is soft, stiff, even grained, straight and clear. Carpenters should find this an ideal substitute for the old-time white pine. It seasons well and shrinks very little, though I have been informed by a builder that it will warp; but this may apply only to one kind of poplar, the yellow. Of course, I speak of the wood in the popular term, for willow and some other trees belong to the poplar family. Speaking of poplar, I have often wondered why it is not more generally used in house construction. It is a very fine wood, and maybe some reader will tell us why it is not generally used.

This wood may be primed the same as white pine, as it takes paint well, the paint dries well, and white work does well on it owing to the clear color of the wood.

Cottonwood is less desirable than poplar, for it does not season well, is liable to warping, absorbs moisture readily, and unless well protected by paint will soon discolor and decay. It is necessary to have the wood dry before painting, as otherwise it will rot under the paint. Use all oil in the priming and rub it in well.

Spruce wood should not be primed until the same has stood to the weather several weeks. It is inclined to split and shrink, hence these defects should be permitted to develop before paint is applied. Then putty will remedy the defect. Add turpentine to the primer, as spruce is rather hard, and going through the planer makes it still harder-surfaced.

Home Planning for Household Efficiency

By Edith Allen

This article describes the way in which successful kitchens have been planned where no servant is kept. The problem of reducing unnecessary steps to the minimum is interestingly solved, and worth while pointers can be gained by the man who is interested in getting the most into his plans.

A large state university commissioned the author to visit numerous homes with a view to obtain authoritative data on just what was required for household efficiency. The results of this survey will appear in these columns in future articles from time to time.

War is increasing the demand for woman labor. This in turn is increasing the number of homes in which one woman does all the work, and those in which she not only does all the work but something else in addition.

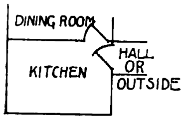
Builders need now to recognize the problems of such homes more than they have been doing in the past. The builder who can plan and build a house for a family of four or five which can be well cared for by one woman, leaving her ample time to enjoy her children and do some outside work, is the builder who will be most popular. At present there are plenty of houses designed for the homes where servants can be secured; but servants are not to be had in a constantly increasing number of cases.

There has been some discussion in the past about the proper size or floor area for a "one woman" house. If the house is perfectly arranged one woman can manage a larger one than if it is poorly arranged. Women who have had to do all the cooking, housework, and care of children and still have had time for some outside interests, consider, as a rule, the house covering a ground area of one thousand square feet. having a basement, first and second floor, and attic, a full one woman job without leaving time for the outside interests or work.

The satisfactory "one woman" house consists of a laboratory-like kitchen, a dining room directly off from the kitchen, bed rooms, living room and as small an amount of hall and closet space as will prevent much passing through rooms where work is being done, and take care of wraps and sundry articles.

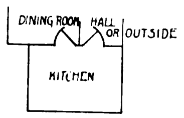
As most of the work in "one woman" houses still centers around the preparation and serving of meals, provision for this must be considered first, Almost every house with a butler's pantry is a home designed so that work can be done most pleasantly and with greatest dispatch when a servant is kept. There is no reason for a butler's pantry in the "one woman" house. It simply makes additional steps on the way from kitchen to dining room. Steps must be saved by the efficient planning of the house. A butler's pantry requires two doors. The swinging of two doors is wearing on the nerves of the worker. If they are left open, the pantry loses part of its function, that of keeping kitchen odors from the dining room. A shallow closet, about eighteen inches deep, in the kitchen will store all necessary utensils and some of the dishes. A china closet in the dining room will take care of the remainder. The care of these two closets will be less

than the care of the pantry, as they are not used as a passage way. In the "one woman" house the kitchen work is lightest when it is all centered in one room. A convenient, light sanitary kitchen is better in such a home than a pantry and kitchen.



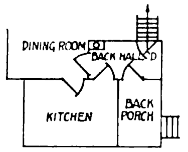
A good arrangement of kitchen, hall or outside, and dining room. The doors are so placed as to keep the kitchen from being used as a passageway.

After an inspection of numerous "one woman" homes it would seem that the small kitchen of about one hundred and ten square feet of floor space makes the best work shop. The work is hindered if the kitchen is a general passage way and place for the hanging of work clothes. If possible, there should be but two doors so close together that anyone going from the dining room through the other door does not pass through the whole kitchen. Whether this other door leads directly to the outside or into a hall or passage to the outside depends upon the family's business.



Note the arrangement of doors. The kitchen should have about 110 sq. ft. of floor space for maximum efficiency.

Such a hall arrangement as the above accomplishes this end in those homes where the man and children feel the need of a back entrance to the house, while the woman can work unhindered. The installation of a water system in the house of moderate means has done away with the need for a direct passage to the kitchen from out of doors. A set basin in this hall does away with the use of the kitchen sink as a family wash basin. This eliminates much extra work and annoyance to the cook in not having to keep her utensils out of the sink. Such an arrangement also saves much dirt in the kitchen. The back hall may also open into another room or have in it stairs to the floor above as well as to the cellar.



A good arrangement where a back hall and porch are desired. The housewife can look out through a window onto the porch, see visitors, watch the children, etc.

If the back porch can be so arranged that the children can play there where the mother can watch them while she is at work, she is saved steps going to see what they are about. A window on the porch of plan three would make this porch a good babies' play room while mother is busy. This porch should be screened. The top of the windows should be several inches higher than the doors. In fly season the kitchen and dining room windows can be lowered, and since the odors from cooking escape through the highest openings flies will gather at the top of the windows, which should be tightly screened, instead of at the top of the doors where they can get into the house. This is one of the best schemes for keeping flies out of the kitchen. A screened skylight for the kitchen, which can be opened, is another device to keep out flies, as it attracts them to the roof rather than the door. It cools the kitchen better than an electric fan and also carries out odors so that they do not get into the rest of the house. The woman who is doing all the work needs as cool a kitchen as she can have during the summer months. Heat is exhausting and she must conserve her strength for at best she has many things to do. A skylight also lights the room and saves wall space that would otherwise be needed for windows. The skylight is practical where this part of the house is one-story high.

Kitchen windows should be planned to serve some definite purpose, such as the means of watching the children or the getting of a good view, and they should be high so that furniture such as tables and sinks can be placed under them. A well planned variety in kitchen windows need not mar the artistic appearance of the house in the least, even when they are planned solely for comfort and convenience.

Proper closets are essential in the "one woman" house. They should be twenty inches deep, which is sufficient to hold the clothing on hangers. Shelves should be built in the upper part. There should be one or two closets for each bedroom. It helps to keep the house in order to have a linen closet either in the bathroom or hall, a closet in the living room for playthings, etc., and one in both the front and back hall to keep wraps.

It is quite a work of fine art to build a satisfactory "one woman" house and there are altogether too few masterpieces of this art to be found.

Chicken Coop That Can Be Added to a Private Garage

A Business Building Hint That Will Prove Profitable.

By Hutt Jensen

The city man who moves to the suburbs wants to keep a little flock of chickens for the sake of fresh eggs and poultry, and as a chicken house is practically never included in a development project the country builders can very easily take up this work and profit from it.

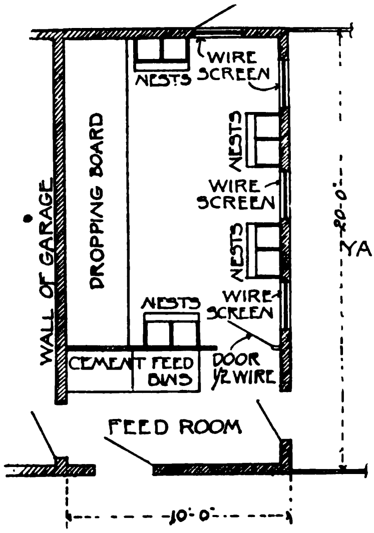
In providing a comfortable and artistic chicken house the builder must know something about chickens, their habits and how to raise them, so that he can provide the right kind of house for them. The construction should be tight enough to prevent freezing temperature inside. The floor should be of earth, best laid over stone and ashes for good drainage. The floor should also be covered with chaff-straw, etc., at least 4 in. deep, for scratching purposes, for the hens must be active to give their best.

Now here is the way a chicken house was made as an addition to a garage on a 50 x 100 lot. The garage was at one corner and was 20 x 20 ft. This left room for a chicken house 10 x 20 ft. and a yard 20 x 20 ft., a plan being shown herewith.

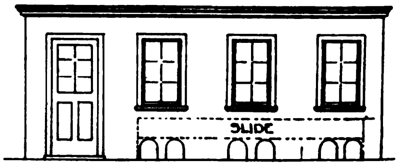
First an excavation was made to the depth of a foot and half, filled with stones, then thinly covered with ashes, and about 3 in. of earth was placed on top. Large rocks were embedded at regular intervals to hold the sills, and projecting about 4 in. above grade, so the sills were off the ground.

The floor section for the feed room, 5 x 10 ft., was made of cement sloping toward the back and drawing into a shallow gutter discharging into the garage drain.

The sills were 4 x 4 in. and framing timbers 2 x 4 in., covered with rough boards on which red cedar shingles were laid to the weather 4 in. to be in harmony with the garage. The roof shingles were stained and side wall shingles were



Plan of a chicken coop that can be added to a garage.



Yard elevation of coop.

painted red to match the garag

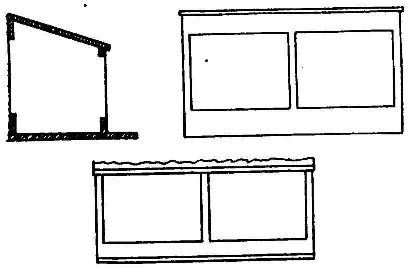
A door was cut from the chicke p into the garage. Entrance can also be had direct from the outside into the feed room. The feed room has two cement feed bins each 2 x 3 ft. in size with wooden covers provided with weights and pulleys. The covers are made tight fitting to prevent the entrance of rodents.

Entrance to the chicken pen is made through a half wire door. There are four windows in this section, hinged to swing outward. These window openings have 1 in. mesh wire so chickens cannot fly against glass and break it. The nests are made in groups of twos hung on the wall 3 ft. from the floor and made so that the chickens cannot perch on top and dirty them, as shown in the accompanying details. The roof is sheathed inside and this wall forms the back of the nests, which are fastened by hooks to wall so as to be easily removable for cleaning.

The dropping board is 3 ft. wide, 15 ft. long, and set at such an angle that the front is 2 ft. from the floor, while the back is 3 ft. from the floor. This is so that the hens cannot stand on the board and make it dirty. Two roost perches of 1 x 2-in. lumber are provided. each 15 ft. long, set one above and back of the other and braced in the center to prevent buckling from the weight of the fowls.

At the lower end of the dropping board a wooden trough, made as shown in the detail, catches what droppings roll off the dropping board and what stick can easily be brushed into it, which should be done at least once in two weeks.

These chicken droppings should be kept dry and can be used as fertilizer in the garden. Roosts should be sprayed and disinfected at regular intervals and the entire interior should be whitewashed twice a year.



Section, rear elevation, and front elevation of typical nests. The nests slope up toward the back so that the chickens can not roost on them.

These things the builder can explain to his customer and prospective chicken raiser, and when the time comes for another job his name will be remembered.

The chicken run on yard is 20 x 20 ft., so five posts were set 10 ft. apart, as shown, and 2 in. mesh wire 8 ft. high is stretched between and nailed to the posts and to boards at bottom, which are 8 in. wide. Stones and earth must be thrown up against these to prevent the fowls from getting under them.

Building a Sanitary Bank Barn

This Type of Structure Is Usually Damp and Unhealthy, But May Be Made Dry as Described in This Article.

By George E. Walsh

The Government distinctly encourages the farmer to keep his buildings in good repair, and when necessary to construct others. It is estimated that owing to the increased crops and the consequent need of greater storage room, that more form buildings will be erected this year than in normal times.

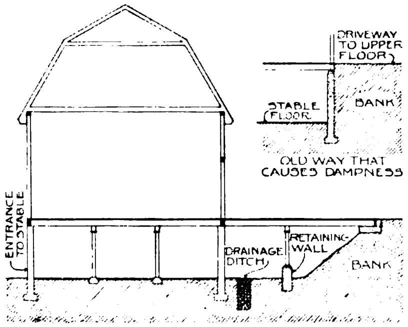
As a result of this pressing necessity of an unusual condition, the old bank barn will come in for considerable attention. The reason for this is that the bank barn is the cheapest and easiest to construct, and it is usually warmer in winter and cooler in summer.

But unfortunately the bank barn as usually built is the most unsanitary of any on account of its dampness from the accumulation of moisture that seeps through the bank and locates permanently on the floor level. But modern construction methods can do away with such undesirable features.

The chief consideration is to remedy the damp evil at the very beginning. This is obtained by bringing the bank down to the barn in the form of a slope instead of perpendicular, and at the bottom of it excavating a sanitary ditch that is later filled up with loose broken stones. The piers carrying the barn are built beyond this ditch, and as a result they will not conduct any surplus moisture in the building.

The old method was to excavate in the bank, leaving the face perpendicular, and placing the foundation walls of the barn close up against the earth. The sub-soil moisture was thus constantly trickling into the wall of the barn, rotting timbers and keeping the interior perpetually damp. The sanitary bank barn, on the contrary, does not have its walls in contact with the bank, and even its foundations are free from any surplus moisture. As it is quite necessary for the best results to place the barn as close to the embankment as possible, a sort of retaining wall of loosely joined field stones should be built at the foot of the slope to keep the earth from being washed down into the ditch. The idea is to keep the surface drainage of the bank from the ditch by this wall, and permit only the sub-soil drainage to enter it. The barn is thus rendered drier and more sanitary than most buildings erected on the level.

A driveway from the top of the embankment to the second story of the barn is provided by bridging over the intervening space by a timber causeway. One end of this rests on the top of the embankment, and the other on the foundation piers of the barn. Half way between supporting piers and joists should rest on the top of the retaining wall so that a perfectly firm and unshakable causeway is secured. If properly built, the heaviest truck can pass over this directly into the barn. It is assumed that the lower part of the barn under the embankment is to be used for stock, wagons or for general storage purposes. If the barn faces the southern sun it will be a much warmer place in winter than any other kind of structure. It will also remain cool in summer on account of its low situation.



Section of bank barn built so as to keep dry.

Old bank barns constructed in the usual way can be altered to fit in this scheme. Such alterations will not cost any material sum considering the advantages obtained. The foundations of the barn need not be disturbed. The face of the bank coming close up against the wall must be excavated a distance of four or five feet at the bottom and ten feet at the top. When this is done so that the slope of the earth is of the right pitch proceed to excavate the ditch midway between the foundation walls and the foot of the bank. Make the ditch two feet wide and dig it from two to five feet deep the whole length of the barn facing the bank. The depth depends upon how wet the soil is, and how much water seeps through the embankment.

Next fill in the ditch with loose broken stones, adding a little sand to pack them firmly in position. When this is completed, build the retaining wall between the ditch and the sloping embankment. This can be made of loose stones or field stones joined together with cement sufficiently thick to hold the wall securely together. Two feet above the foot of the embankment is sufficient. At two points where the upper driveway is to enter the barn make a concrete footing for five by six beams. Set these up and tie together by scantling, and then lay the driveway beams across them so that the middle rests on the uprights and the ends on the barn and the embankment.

A Manure Pit Eliminates Waste

The Farmer Who Does Not Yet Realize the Value of a Roofed Manure Pit Should Have Its Value Pointed Out to Him

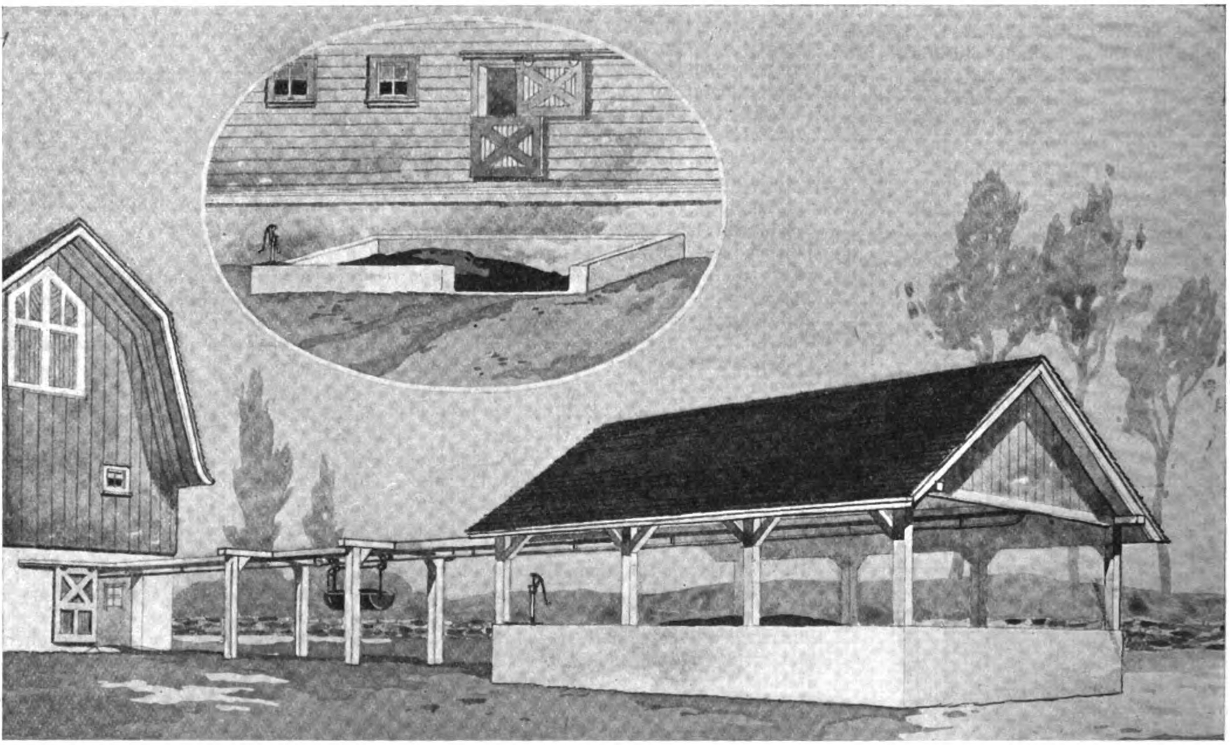
By Frank T. Fellner, Architect

An important and profitable addition to the farm for the storing of manure, eliminating the waste which occurs when stored on the ground under the continued action of the sun, is the manure pit roofed over and connected direct to the litter alleys with an overhead litter carrier track and carrier to barn.

This style of pit is simple in design and construction, forms a waterproof pit for the storage of the manure with provision for pumping off the liquid manure for garden or truck patch when required.

Floor of pit is of concrete, 5″ thick, reinforced with wire mesh or woven wire fencing, running continuous on all sides of pit. Reinforcing is embedded in the concrete 2″ from the bottom, and run up side walls as shown on accompanying plans.

Concrete is formed into one continuous mass, side walls being 6″ thick, and rounded off at top edges.



Perspective of concrete manure pit roofed over. The shallow pit shown in the insert above, is sufficient if the manure is carted away frequently.

Manure stored in this way is a money saver for the farmer, as this most valuable by-product is stored until ready for use, under the most favorable conditions for the chemical action taking place.

Two types of concrete pits are shown, the deep pit for storage, and the shallow pit if the manure is to be carted away very frequently. A runway is provided, allowing a manure spreader to back into the pit for loading.

Excavate for pit to a depth of 3′ 6″, as shown on plans, and set spread footing of concrete.

Floor of pit is graded to sump, which is formed of concrete, about 2 ft. in diameter and 2 ft. in depth, with hand pump installed for pumping out the liquid manure.

The roof is supported by 4″ x 6″ Y.P. posts embedded in concrete and set plumb and true. Roof rafters on 2″ x 6″ spaced 20″ on centers covered with sheathing boards and shingles, set 5½″ to the weather.

Overhead carrier track is hung from roof of pit and carried to barn, allowing for clearance under track. Track is supported upon posts as shown, and should be set wide enough apart to allow ample clearance for manure carrier.

Leaders are provided, with gutters, to drain into pit.

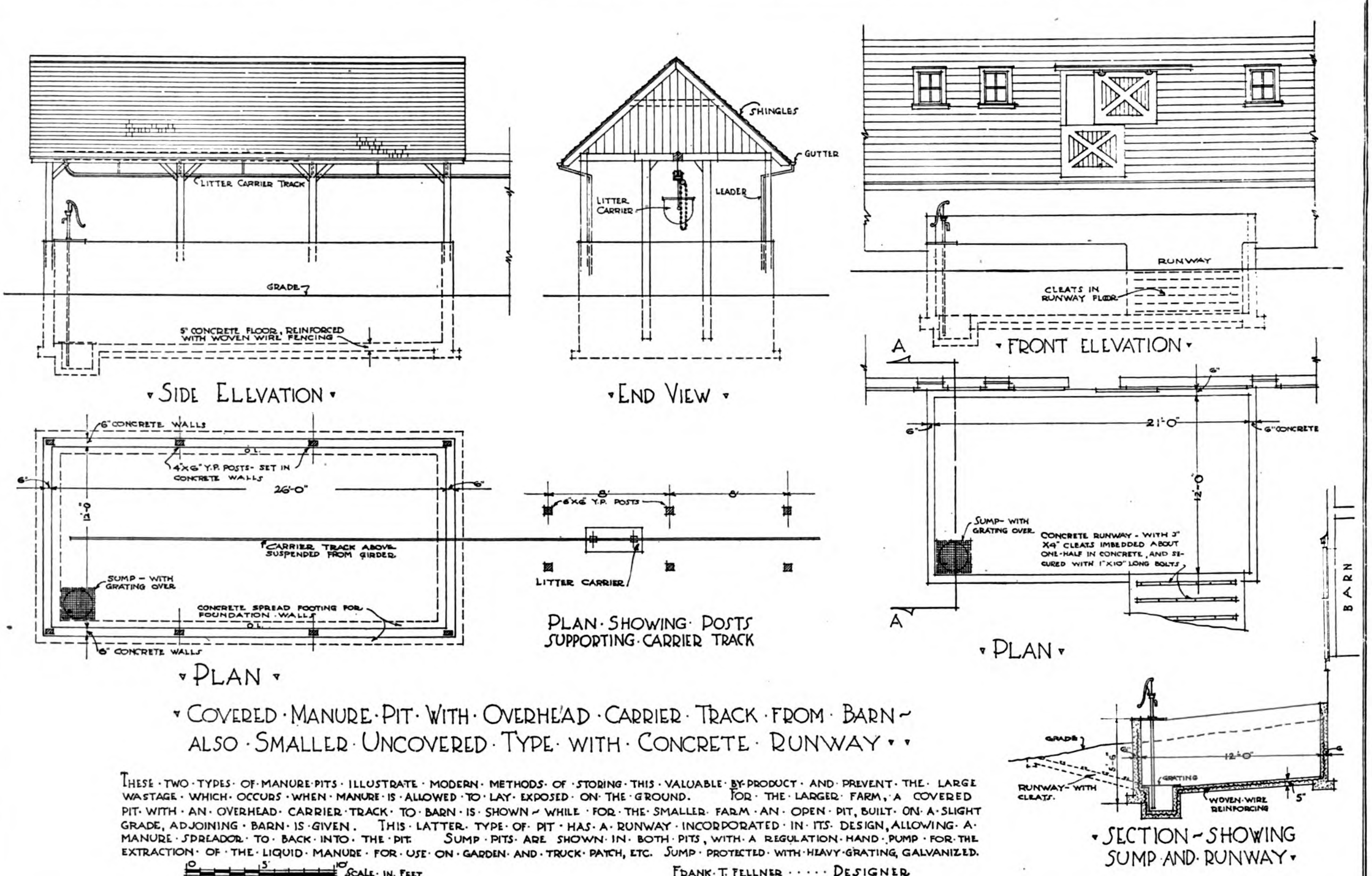
Excavation for the shallow type of pit is carried down as shown on section, with foundation floor and side walls of concrete, reinforced with wire mesh, the same in general method as the large type of pit.

This type of pit can be erected next to the barn, and can readily be constructed on a sloping grade, as shown.

A sump and hand pump for liquid manure is also provided in a lower corner of pit.

If a manure spreader is to be used, a runway can be provided in the wall, with a gentle slope and cleats embedded partly in the concrete and firmly held with bolts 1″ x 10″ in length, embedded into the concrete.

Concrete for both pits is composed of one part of Portland cement, two parts of clean sharp sand and four parts of broken stone to pass through a 2″ ring.



COVERED · MANURE · PIT · WITH · OVERHEAD · CARRIER · TRACK · FROM · BARN ~ ALSO · SMALLER · UNCOVERED · TYPE · WITH · CONCRETE · RUNWAY

THESE · TWO · TYPES · OF · MANURE · PITS · ILLUSTRATE · MODERN · METHODS · OF · STORING · THIS · VALUABLE · BY-PRODUCT · AND · PREVENT · THE · LARGE WASTAGE · WHICH · OCCURS · WHEN · MANURE · IS · ALLOWED · TO · LAY · EXPOSED · ON · THE · GROUND. FOR · THE · LARGER · FARM, · A COVERED PIT · WITH · AN · OVERHEAD · CARRIER · TRACK · TO · BARN · IS · SHOWN ~ WHILE · FOR · THE · SMALLER · FARM · AN · OPEN · PIT, BUILT · ON · A · SLIGHT GRADE, ADJOINING · BARN · IS · GIVEN. THIS · LATTER · TYPE · OF · PIT · HAS · A · RUNWAY · INCORPORATED · IN · ITS · DESIGN, ALLOWING · A · MANURE · SPREADOR · TO · BACK · INTO · THE · PIT. SUMP · PITS · ARE SHOWN · IN · BOTH · PITS, WITH · A REGULATION · HAND · PUMP · FOR · THE EXTRACTION · OF · THE · LIQUID · MANURE · FOR · USE · ON · GARDEN · AND · TRUCK · PATCH, ETC. SUMP · PROTECTED · WITH · HEAVY · GRATING, GALVANIZED.

0 5' 10' SCALE · IN · FEET

FRANK · T. FELLNER · · · · · DESIGNER

Bank run gravel can be used if found most convenient.

Reinforcing for pits is of heavy wire fencing or wire mesh, embedded in the floor and walls as noted above.

Wooden forms required for either type of pit are simple in construction. Boarding 1" thick, dressed on one side, and 2" x 4" pieces for uprights and braces constitute the forms. Miscellaneous lengths of sound material found about the farm can be pressed into service for use as forms. When forms are constructed and ready for the pouring of the concrete, the faces of forms should be greased to allow of easy removal when concrete has set.

Ten or twelve days should elapse before pits should be put to actual use.

A grating over sump is removable and is of strong galvanized iron, capable of protecting sump.

A small regulation hand pump with intake pipe of sufficient length to reach to bottom of sump will be ample. Pump is bolted to concrete wall, or in the case of small pit, is erected on a small platform.

A litter carrier with adjusting attachment for raising and emptying carrier is provided.

Estimate of Materials Required

Large Pit

Concrete (floor, walls, etc.)	20 cu. yds.
Wire reinforcing	135 sq. yds.
Posts for roof (4'x 6") girders,	260 lin. ft.
Roof sheathing, 1" boarding	1M. ft.
Shingles	4 bundles.

Small Pit

Concrete (floor, walls, etc.)	13 cu. yds.
Wire reinforcing	72 sq. yds.
Wood cleats (3" x 4" stuff)	40 lin. ft.
Bolts (1" x 10" long)	30 bolts.

Legal Department

Can Injured Workman Claim Compensation When Relying on Verbal Promise?

That a promise of an employer's superintendent to give an injured employee an easy job as soon as he is able to work does not estop the employer from setting up the employee's delay in filing his claim as a bar to the recovery of an award, there being no fact, falsely asserted, that induced the employee not to file his claim, was the decision in a recent case.

It appeared that the claimant was injured on Aug. 12, 1914. He did not file his claim until March 5, 1917—nearly two years and six months after the injury. Evidence showed that when he notified the superintendent of his injury, the latter replied: "We will take care of you." The court dismissed the employee's claim on the ground that he had not given due notice of his injury under the New York Compensation Act.

When Architect Is Unjust Can Contractor Be Sued?

That an architect is not justified in acting arbitrarily, oppressively or maliciously because he believes a contractor is not acting according to one provision of the contract is the decision in another late Missouri case. Suit was started by an owner against a contractor to recover damages. It appeared that a contract to erect a house and garage on the owner's lot had been entered into. After the excavations were made and the foundations were constructed the contractor was unable to complete his work and the owner made a new contract to take the place of the old one.

The owner's architect certified that the new contractors were not proceeding in accordance with the plans and specifications and advised the owner to terminate the contract. The owner accepted the architect's advice and thereafter brought suit for $2,164.91, which he had been compelled to pay to complete the building in excess of the contract price. The court decided that though the building contract provided the architect's certificate should be conclusive, it was not binding where the plans and specifications were construed in bad faith, arbitrarily, oppressively or maliciously and that the owner would be precluded from recovering where an architect was so acting, even though a charge of fraud and conspiracy between the architect and owner could not be sustained.

All readers are invited to ask any questions whose solution will help them solve any legal difficulty that they may be in. Our legal adviser, George F. Kaiser, LL.B., will answer direct by mail and give his opinion as to the correct procedure. Such of the questions and answers as are of general interest to the trade will be published in these columns.

All inquiries must be accompanied by the name and address of the correspondent, so that he may be answered direct or that he may be requested for further information if necessary to the intelligent answering of his question. No names will be published, only initials or a nom de plume. Remember that this service is free to subscribers.

Address Legal Department, Building Age, 243 West 39th Street, New York City.

What Does "Working Days" Mean?

The words "working days" have again been construed by one of the higher courts. This time in Missouri.

The court said concerning the meaning of these words:

"We regard it as clear that the term 'working days' as used in the contract should be taken as excluding not only Sundays and holidays, but also days upon which work could not be done because of weather conditions. Had this not been the intention of the parties, it may well be assumed that a definite day for the completion of the work would have been agreed upon. The only extrinsic evidence in the record regarding the meaning of the term 'working days' is the testimony of the architect of the building. In response to questions propounded to him he testified to the effect that by 'working days' was meant days upon which 'weather conditions were such as to permit work to be done'—i. e., where the building was, as here, not under roof; but that Saturday is a working day; a whole working day.

"Though the questions asked this witness were not so framed, it is evident that it was sought to elicit from him as an architect testimony as to a usage and custom among architects and build-

ers with respect to the construction of such words in a building contract.

"We think that the parties must have intended that days upon which work could not be done because of weather conditions would be excluded in computing the period of 55 working days. We know of no good reason for assuming that they intended that Saturday be counted as half a working day within the meaning of the contract. Though it be that owing to 'labor rules' work was suspended on Saturday afternoons we are of the opinion that under the contracts of this character Saturday is to be construed as a working day in the absence of anything to indicate a contrary intention. There is no evidence that by usage and custom in such business in the community the terms 'working days' is to be so construed."

Can Person Furnishing Engineering Designs Obtain Mechanic's Lien?

In California under the statutory provision that "a person bestowing skill in construction of a building at the request of the owner or any authorized person, is entitled to a lien," a person furnishing engineering designs, actually used in the construction of a building, at the request of the owner's architect, is entitled to a mechanic's lien.

The court in this case said:

"Architects and all persons of every class bestowing skill or other necessary services to be used in the construction of a building are entitled to a lien under the California Code, where at the instance of the owner or of any other person and by his authority or under him as contractor, and, further, every architect having charge of the construction either in whole or in part of any building shall be held to be the agent of the owner for the purpose of the lien law.

When Mechanic's Lien Is Recorded Must Lis Pendens Be Recorded?

Does a party who in due time records a sufficient and valid mechanic's lien have to record a notice of lis pendens upon the foreclosure of that lien in order to charge and hold the property against the purchaser during the pendency of the action, is the question submitted to the California courts in a recent case.

The California Lien Law provides:

"No lien provided for in this chapter binds any building, mining claim, improvement or structure for a longer period than 90 days after the same has been filed unless proceedings be commenced in a proper court within that time to enforce the lien."

Suit was started by the contractor who was the lien claimant against the property owners as the work was commenced; the lien was filed and action was instituted in due time. After the action was started the property was sold.

The court decided that the provisions of the California statute mean by implication that when proceedings to enforce a lien are commenced within 90 days, the lien continues and it is unnecessary to file a notice of pendency of the action and for that reason the contractor's lien was good as against the purchaser.

Must Unnecessary Work Be Paid for?

In a recent Utah case it was decided that where the city engineer of Salt Lake City improperly and unnecessarily required a contractor to put earth on the slopes of excavations and embankments of a reservoir to protect them while the work was suspended because of winter weather, the contractor had the right to recover for the extra work despite the contract.

"Unjust work wholly unnecessary and within the contract and not contemplated by the parties" may be recovered for by the contractor, said the court, regardless of the provisions of the contract in such cases.

The terms "extra work" and "additional work" were defined by the court as follows.

"The term 'extra work' in a construction contract applies to work of a character not contemplated by the party and not controlled by the contract, while 'additional work' is such as may fairly be presumed to arise in the construction and is within the contract, although not included within the plans and specifications."

The contractor was therefore given judgment for $12,775.57 for the extra work, in addition to the amount paid him under the contract, which was $40,451.30.

If Incompetence Is Alleged Does It Form Grounds for Damages?

Saying that a roof is "in danger of falling," the architect who superintended its construction has been "notified and has ignored the notification"—and that "this development does not speak very well for him" is libel according to a late New York decision.

Suit was instituted by an architect against a newspaper publisher for damages claimed on the ground of printing libelous statements, charging general unskillfulness or carelessness in the prosecution of his profession as an architect.

The article complained of was printed by the publisher and was as follows:

"Binghamton has a new $750,000 high school which was first used when the fall term began. Yet 850 pupils of that same high school are in possible danger because of conditions which have come to the attention of the school board. The roof is in danger of falling. One portion of it has broken away from the I-beams and has sagged toward the floor. At present the roof is propped up but if it should fall it would be disastrous to life and property. The architect has been notified but has ignored the notification. An expert has been sent for and precautions have been taken. This precaution does not speak very well for those who designed and built Binghamton's new high school."

The court in deciding that the words used in the article were actionable and that the architect had a good cause of action, said:

"In this case the article complained of after stating that the roof of the Binghamton high school was in danger of falling," said, "This development does not speak very well for those who designed and built the high school." It was clearly inferable from this statement that the architect had made a faulty design. Nothing it seems to me could injure an architect more than to charge that through his unskillful and careless drawings a great public building had either fallen or was about to fall. It occurs to me that no person who knew it would afterwards employ him. However, the article goes on still further than merely charging a faulty design in a particular case. It says that the threatened fall of the roof "does not speak very well" for the architect. That which does not speak well of a man must of course speak ill of him; that which speaks ill of him must affect his character and give him a reputation which is damaging. Thus we find that the very article makes the charge of general unskillfulness or general carelessness as shown by a specific instance. Vosbury vs. Utica Daily Press Co., 183 A. D. 169.

It is well understood as a proposition of law that when words are spoken or written of a man imputing general incompetency to him in his professional capacity that he has a right to sue and recover damages from his defamer for the loss suffered by him by reason of the spoken or written defamation.

Can Time for Filing Lien of Dealer be Extended by Unauthorized Delivery?

That a material man cannot extend his time for filing a mechanic's lien by an unauthorized delivery of $.30 worth of materials after the job has been practically finished is the decision in a late case of the Supreme Court of Iowa.

In this case suit was started to foreclose a sub-contractor's lien. It appears that when the owner had contracted for the erection of the building the contractor went to a material man and had an estimate made of needed material, which was delivered but never paid for. On Aug. 5 the last delivery of material was made. Thereafter and about Oct. 17 the material man sent two 2 x 4 in. 8 ft. long, for which a charge of $.30 was made. On Oct. 20 that material man filed a mechanic's lien. The court in deciding that the material man's time to foreclose was not extended by the $.30 delivery, said:

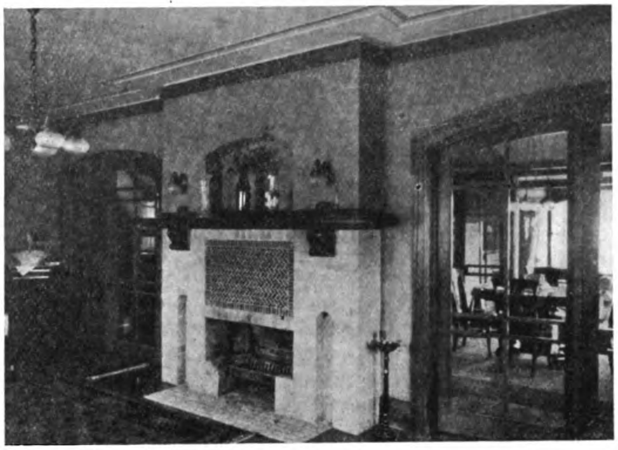
"It is plain in this record that this delivery of $.30 worth of material at the premises was not by order of the contractor to be used in the building, but for the sole purpose of extending the time in which to file the lien. We have therefore no hesitancy in saying that it was not a good faith delivery under the contract. Action to foreclose denied."

A Brick and Stucco House Built in Wisconsin

Both Plan and Design Present Features That Are of Interest—An Exceptionally Complete Set of Details Accompanies This Article

An effective roof is generally the most important reason for the success of any design. Proper breaking up of its contour is essential if top-heaviness is to be avoided, and yet the method of breaking up the roof lines must harmonize and be subsidiary to the main roof itself.

The roof is attractively broken up by a half timbered gable



The living room, looking toward the stairway, fireplace, and dining room

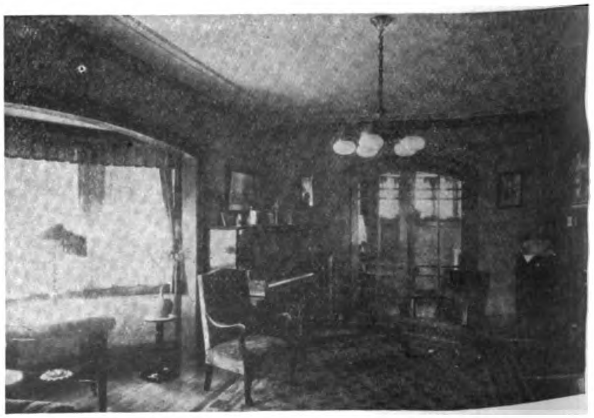
Successfully handled indeed is the roof of the house of Mr. Frank Olson. A long sweep of roof is carried down over the porch, where massive stucco columns give strength and stability to the overhang. A small dormer makes livable the space provided by the long overhang. The main section of the roof butts against a well-proportioned gable, whose half-timber and stucco face forms an attractive texture for this dominating part of the design. The segmental window head, capped by half-timber effect, helps to make the gable even more interesting.

The porch opens into a vestibule from which the house can be entered in two ways, either into the living room proper, or into a lavatory and closet from which passage may be had into the nursery. This latter arrangement is decidedly out of the ordinary, but is an advantageous one in that it keeps the children from romping through the main part of the house on their way to and from play. The lavatory also serves as a place where outer garments may be removed in stormy weather.

The main feature of the living room is a large fireplace built of light-colored brick, with a center insert of tile. On each side of the fireplace are segmental head doorways communicating respectively with the stairs and the dining room. Opposite to the fireplace is a bay window, which serves to add variety to the room.

The dining room is treated novally indeed. The ceiling is pitched gable-like, panel strips giving added variety. A built-in china closet harmonizes well with the ceiling treatment. The lighting is interesting, the main source being a central

The living room, looking toward the vestibule. Note how doors shut this room off from the vestibule, stairs and dining room, thus lending added privacy



Supplement to Building Age, December, 1918

House of Mr. Frank Olson, at Wauwatosa, Wis. Clare C. Hosmer, Architect

fixture with a central semi-indirect and pendant direct lights. Frosted bulbs are placed in the ceiling in the wooden strips.

The dining room opens onto a veranda which can be used as a breakfast porch in summer. A window opens into the pantry, making serving easy to a table placed by it. This veranda has a concrete floor.

The pantry is well provided with cupboards. The icebox, which is placed here, can be iced from the entry outside, and is just beside the grade door. This rear entry contains the back stairs leading to the cellar.

The electric fixtures in the kitchen are well placed, and constitute efficient practice. There is a central fixture, a wall fixture over the sink and another over by the range. The gas range is placed in an alcove and has a hood with a register to carry off all odors from cooking. The placing of windows is also interesting as showing how excellent natural lighting is obtained.

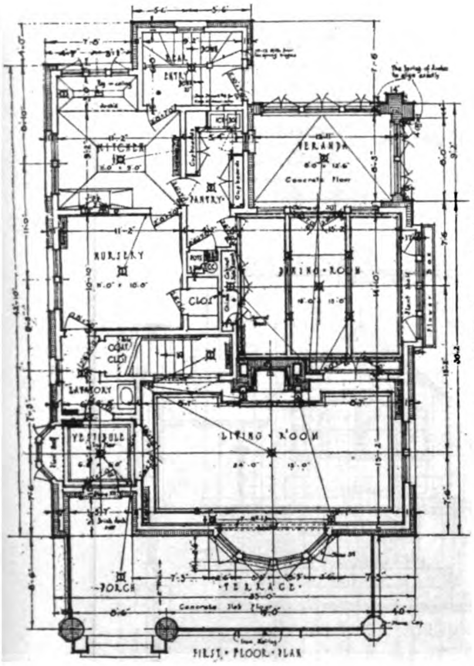
The second floor has three bedrooms, each of which has plenty of wall space so that this effective placing of furniture is simplified.

One of the bedrooms has a serving room adjoining.

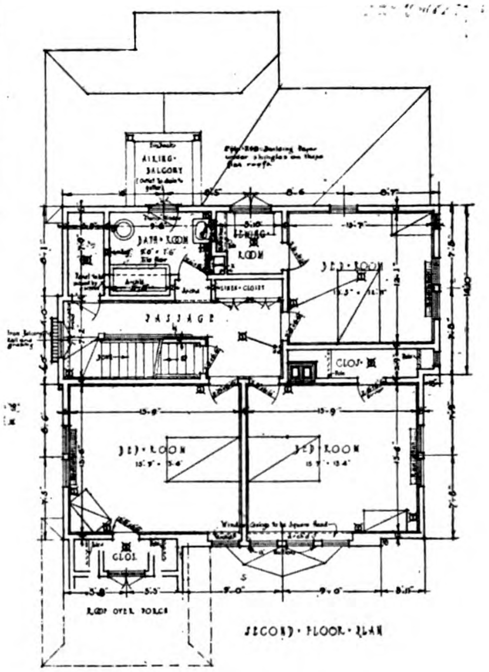
An airing or drying balcony opens from the bathroom. A good feature of the bathroom is the towel closet. There is also a medicine closet.

This house was constructed at Wanwantosa, Wis., for Frank Olson, in accordance with plans and specifications prepared by Clare C. Hosmer, architect, 64 W. Randolph Street, Chicago, Ill.

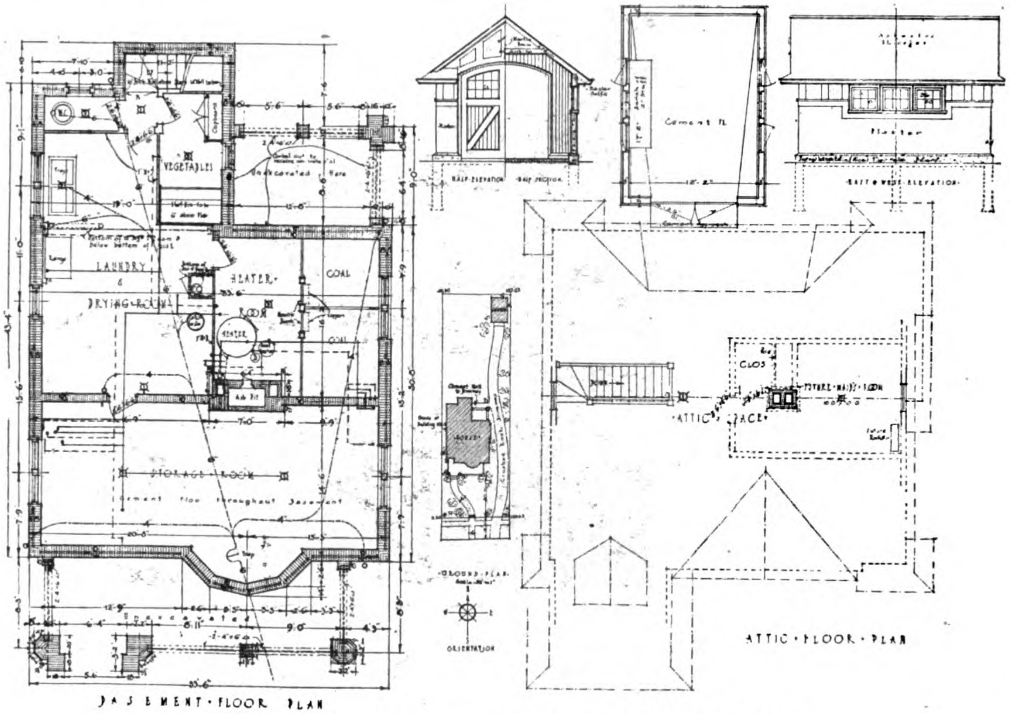
The dining room, looking toward the veranda or breakfast porch. Take particular notice of the ceiling and china closet, for both are decidedly out of the ordinary



First and second floor plans, scale 1/16″ = 1 ft. The plans present several novel features worth studying, and the text of this article should be carefully read in this connection

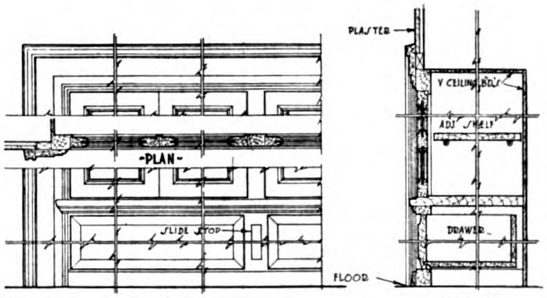


The rear of the house

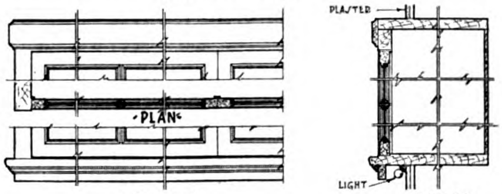


Plans of basement, attic and roof. Elevations and plan of garage.
Scale 1/16" = 1 ft.
Plot plan, showing orientation

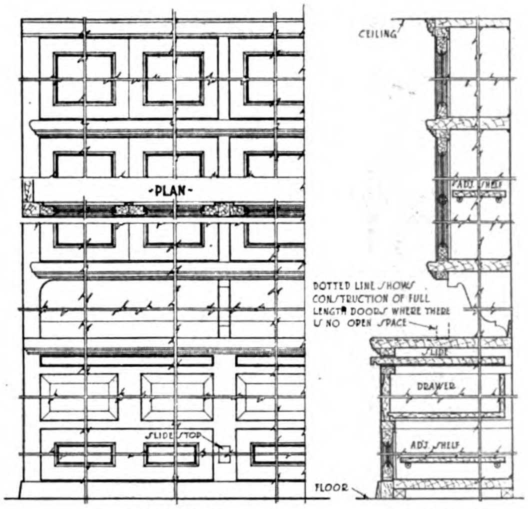
Elevations and cross section of side wall, scale 1/16" = 1 ft.



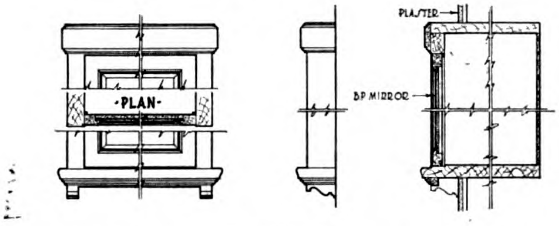
-ELLEVATON- -SECTION-
DETAILS OF LINEN CLOSET



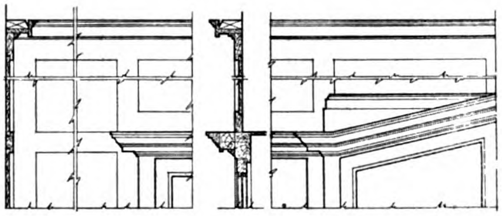
-ELEVATION- -SECTION-
DETAILS OF KITCHEN CUPBOARD



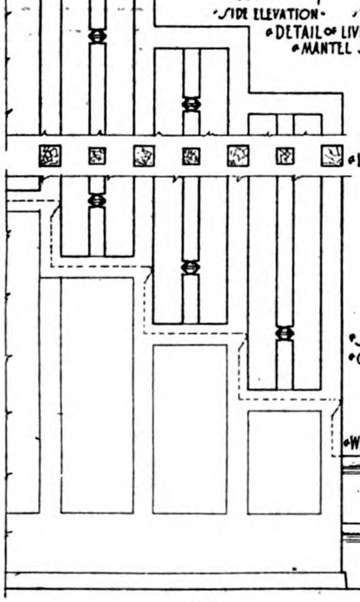
-ELEVATION- -SECTION-
DETAIL OF PANTERY FIXTURES

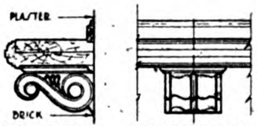


-FRONT ELEVATON- -SIDE ELEVATION- -SECTION-
DETAILS OF MEDICINE CASE

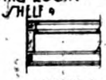


-ELEVATION & SECTION-
DETAILS OF CHINA CLOSET

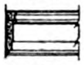




-SIDE ELEVATION- -FRONT ELEVATION-
DETAIL OF LIVING ROOM MANTEL SHELF



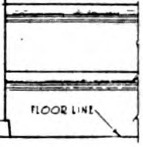
-SECTION-
CASING FOR LIVING & DINING RM'S



-SECTION-
CASING

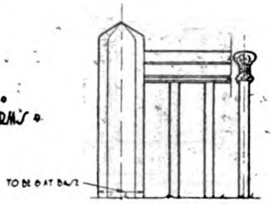
-SECTION-
STRIP ON CEILING OF DINING ROOM

-SECTION-
WAINSCOTING CAP

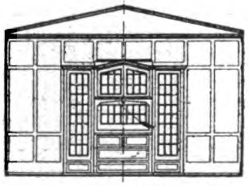


-ELEVATION-
DETAIL OF STAIRS

-PLAN-
DETAILS OF CHINA CLOSET



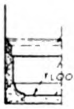
-ELEVATION- -SECTION-
DETAILS OF NEWEL HAND RAIL & BALUSTERS



-ELEVATION-
CHINA CLOSET IN DINING ROOM

-PLAN-
DETAILS OF NEWEL & BALUSTERS

-PLAN-
DETAILS OF DOORS

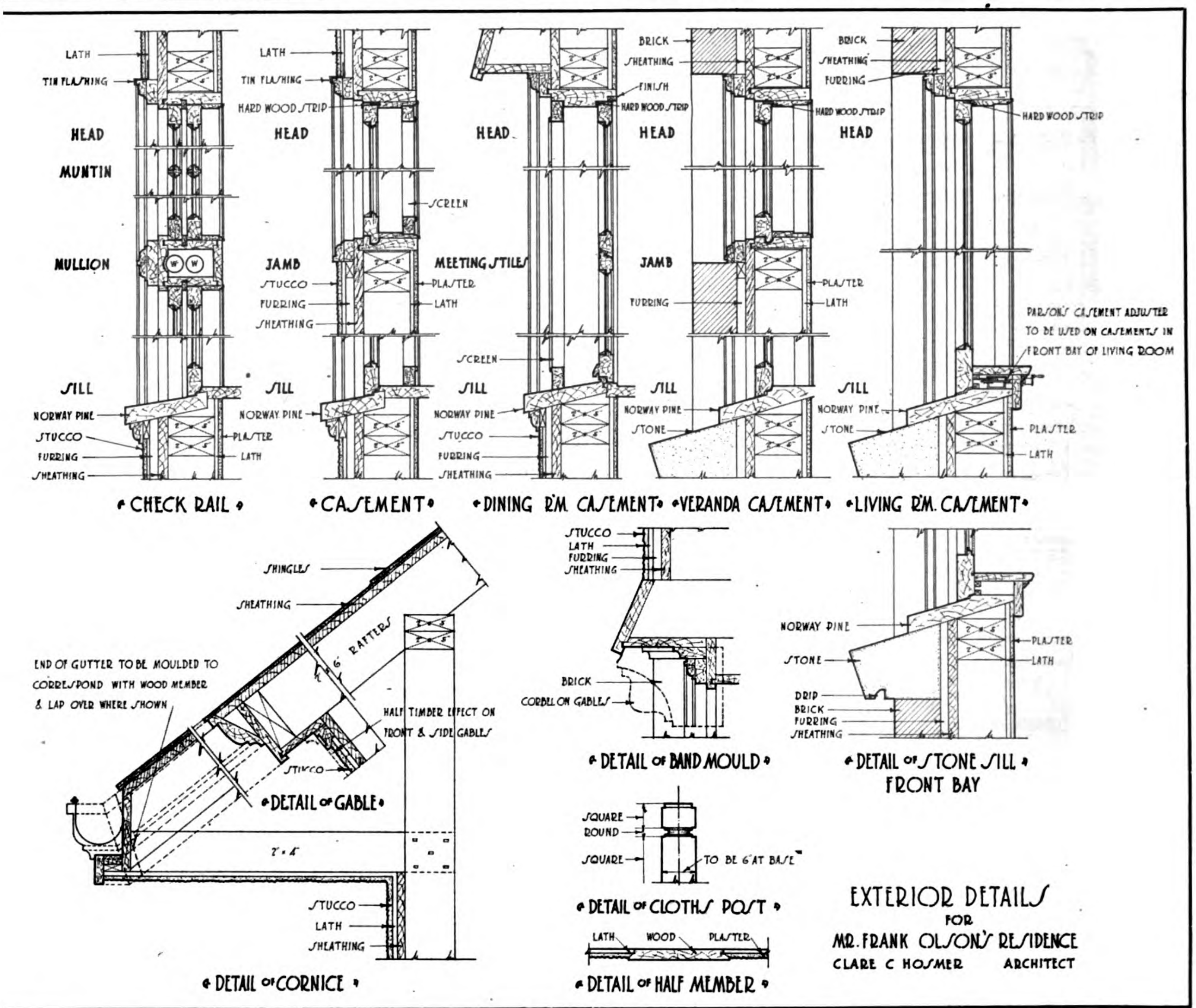


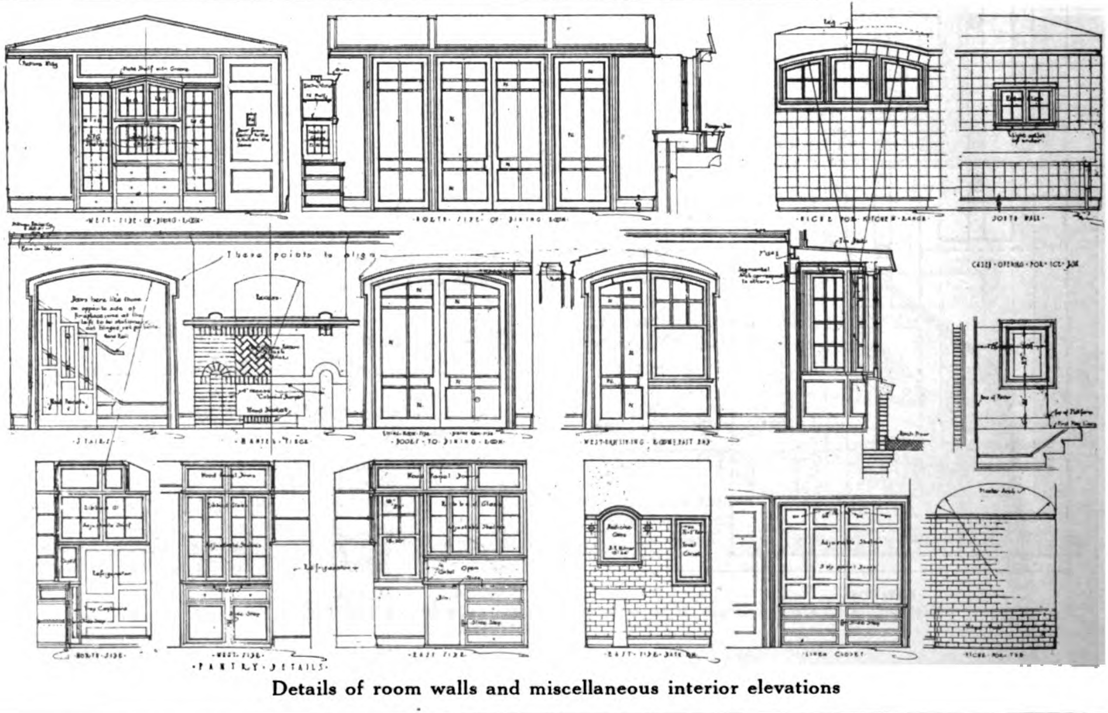
-SECTION-
COVE SHOE IN KITCHEN PANTRY

SECTION-
BASE BOARD

INTERIOR DETAILS
FOR
MR. FRANK OLSONS RESIDENCE
CLARE C HOSMER ARCHITECT

AB





Details of room walls and miscellaneous interior elevations

Construction Questions Answered

If you want help in any branch of building construction, just write to this Department. We will be glad to answer all your questions without charge.

Questions should be confined to construction only, as the editors cannot undertake to design any structures.

All readers are invited to discuss the questions and answers published.

Proper Method of Flashing Valleys

From W. J. C., New York.—I enclose a photograph of my house, which has been built about twelve years. It is a four-gable house, and the valleys in the roof have given me considerable trouble. I wish to change the roof so as to do away with the valleys, and would appreciate very much your opinion as to whether the change indicated in the drawing would harmonize with the architecture of the house.

Answer—The change which you propose to make in the roof of your house is not a good one. The roof lines of the house, as shown on the photograph which you enclosed, look good and are in keeping with the balance of the house. The change if made would certainly destroy the architecture of the house, as it would give it a box-like appearance, which would not have the characteristics of any particular style or be as pleasing to the eye as the house is now. I do not understand why a drastic alteration such as you had in mind should be made when the trouble you complain of can be remedied at a sum not anywhere near as costly as altering the entire roof.

I feel confident that if the new valleys are laid with proper material and good workmanship the valleys can be made tight. I have had quite a little experience with this particular kind of work and have never had any trouble. For your information as to the materials to be used and the method of laying, the following memorandum specification, which would fit your case, is given:

Fig. 1—View of a house which causes trouble by leaking valleys. The owner wants to remodel the roof, as shown in Fig. 3

Specification of workmanship and materials necessary in the placing of new roof valley flashings.

Remove the present shingles where necessary in order that the present valley flashings can be taken out. The premises below shall be protected from inclement weather during the removal of existing materials, and until the work is completed. Contractor to be responsible for any damage resulting from his neglect to properly care for and protect the premises.

Remove all present valley flashings and lay new ones. Tin for use in this work shall be of IX thickness. The underside of tin shall be painted one good coat of red lead mixed with pure linseed oil. The mix shall be in the proportion of 25 lb. of lead to 1 gal. of oil. New valleys shall be formed with flat seams well soldered; sheets shall be laid the narrow way. New flashings shall be 20 in. wide.

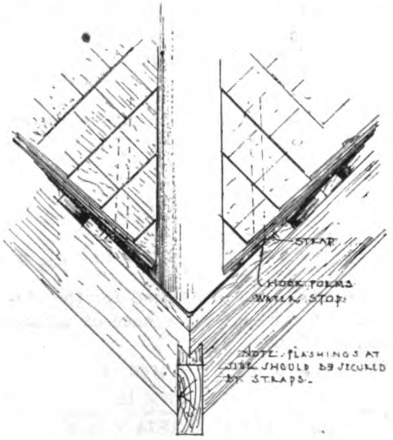


Fig. 2—Proper method of constructing valleys to avoid leaking. The flashing is turned over as shown, forming a water stop

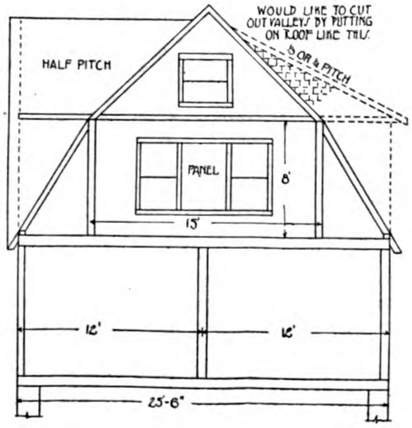


Fig. 3—The sketch submitted by the owner, showing how he wanted to remodel the roof

Immediately after the flashings are laid the surface of same shall be painted with one coat of red lead and oil mixed as hereinafter specified. Paint shall be applied with a hand brush and rubbed on well. Second coat of paint shall be applied in a similar manner as hereinbefore specified in about two weeks, or when the first coat has sufficiently hardened. Second coat of paint may be iron oxide, metallic brown or Venetian red mixed with the oil instead of the red lead as hereinbefore specified for first coat, dependent upon the color which the owner may select.

After the new valley flashings have been placed in position lay shingles of a kind to match those now in position.

Guarantee—Before final payment is made a written guarantee shall be given the owner by the contractor guaranteeing the new flashings to be watertight for a period of two years.

Note—A two-year guarantee is sufficient to cover a condition of this kind, and if tight during that period they will be so for any number of years if properly painted and taken care of. W. G.

Designing a Retaining Wall When Earth Slopes at Top

From G. E., Elizabeth, N. J.—The article on "How to Design a Retaining Wall" which appeared in your July issue, was very instructive and useful to me. Would it be asking too much to inquire as to the manner of treating a case like mine, in which the earth surface at top of wall has a slope of 1½ to 1 instead of being level with top of wall.

Answer—The formula for earth thrust as given in the July issue of BUILDING AGE was for a level top surface. In case the top surface is not level the Rankine formula for earth thrust is

$$P = \tfrac{1}{2}\, wh^2 \cos\theta \, \frac{\operatorname{Cos}\theta - \sqrt{\cos^2\theta - \cos^2\phi}}{\operatorname{Cos}\theta + \sqrt{\cos^2\theta - \cos^2\phi}}$$

in which w = weight of earth per cu. ft.
h = total height of surface in feet.
θ = angle of inclination of top surface.
ϕ = angle of repose of the earth.

For the case in question, with a top surface slope of 1½ to 1, $\theta = 33° - 40'$ and $\cos\theta = .832$. With ϕ assumed at 35° and $w = 100$, we have

$$P = \frac{100h^2}{2} \times .832 \times \frac{.832 - \sqrt{.832^2 - .819^2}}{.832 + \sqrt{.832^2 - .819^2}} = 29.4h^2$$

As shown in the illustration, this thrust P acts parallel to the top surface.

To investigate the stability of the wall, the horizontal and vertical components of the earth thrust are used and combined with the component weights of the wall and earth, as described for the wall with level top surface.

Due to the fact that the earth thrust for a sloping surface is greater than for a level surface, an investigation of the wall designed in the July issue would show that it would be unstable for a surface having a slope of 1½ to 1. A wider base would therefor be used and a width of 8′ — 0″, or half the total height of the wall, has been adopted for investigation.

TABLE A

	Weight W	Hor. Thrust H	Lever Arm	+ Moments	− Moments	Safety factor against overturning
	Pounds	Pounds	Feet	Foot Pounds	Foot Pounds	$=\frac{105,920}{58,860}=1.80$
$W_1=14.75\times1\times150$	2,210	......	2.50	5.520	......	
$W_2=8\times1.25\times150$	1,500	......	4.00	6,000	......	Safety factor against sliding
$W_3=5\times\frac{14.75+18.08}{2}\times100$	8,200	......	5.58	45,760	......	$=\frac{0.5\times17,990}{9,140}=0.98$
$V=10,990\times.554$	6,080	......	8.00	48,640	......	
$H=10,990\times.832$	......	9,140	6.44	......	58,860	
	17,990	......	......	105,920	58,860	

The earth thrust P acting on the plane A B is equal to

$$P = 29.4 \times 19.33^2 = 10,990 \text{ lb.}$$

The vertical component of the earth thrust is equal to

$$V = P \sin \Theta = 10,990 \times .554 = 6080 \text{ lb.}$$

The horizontal component of the earth thrust

$$H = P \cos \Theta = 10,990 \times .832 = 9140 \text{ lb.}$$

Taking moments of all the forces about the outer toe of the wall the accompanying table is then computed.

The overturning moment due to the earth thrust is 58,860 ft. lb., while the sum of the resisting moments is 105,920 ft. lb., giving a safety factor against overturning of 105,920 ÷ 58,860 = 1.80. This is considered safe.

The horizontal component of the earth thrust tends to slide the wall along on its base, and this is resisted by the friction of the concrete on the earth along the base of the wall. The safety factor against sliding is therefore equal to 0.5 × 17,990 ÷ 9140 = 0.98. As this value is rather low it would be best to use a toe wall, placed either at the outer toe or under the vertical stem as shown dotted in the illustration.

The detailed design of the vertical stem is as follows: The earth pressure

$$P_1 = 29.4h_1^2 = 29.4 \times 14.75^2 = 6400 \text{ lb.}$$

The horizontal component is equal to

$$H_1 = P_1 \times \cos \Theta = 6400 \times .832 = 5320 \text{ lb.}$$

The bending moment at the base of the vertical stem

$$M_1 = H_1 \times \frac{h_1}{3} = \frac{5320 \times 14.75}{3} = 26,160 \text{ ft. lb.}$$

Using the standard notation recommended by the Joint Committee, we have

$$bd^2 = \frac{M}{K}$$

$$\therefore d = \sqrt{\frac{26,160 \times 12}{12 \times 107.4}} = 15.5''$$

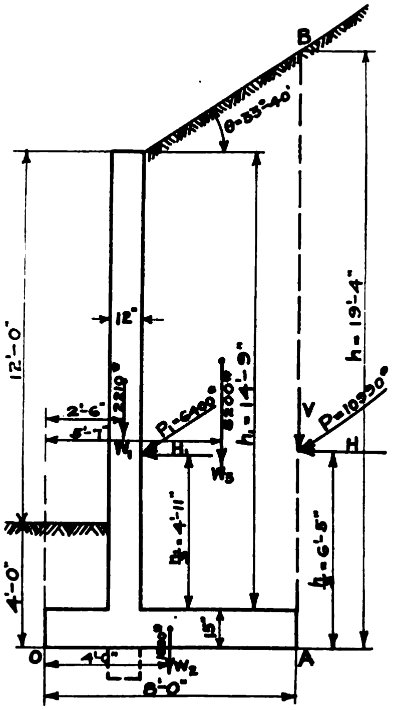
and allowing 1.5″ protection for the steel gives a thickness, at the base of vertical stem, of 17 in.

The area of steel required is

$$A_s = \frac{M}{f_s jd} = \frac{26,160 \times 12}{16,000 \times 0.874 \times 15.5} = 1.45$$

Use ⅝ in. square bars spaced 3 inches center to center, giving a steel area of 1.56 sq. in. These bars can be stopped off at intervals in a manner similar to that used for the wall with level top surface.

The total shear at base of the vertical wall is equal to 5320 lb. per lin. ft.



Drawing illustrating calculations necessary to design the retaining wall under the conditions submitted by the correspondent.

$$\text{Unit shear } v = \frac{V}{bjd} = \frac{5320}{12 \times .874 \times 15.5}$$

= 29 lb. per sq. in.

The bond stress on the bars

$$u = \frac{V}{\Sigma_o jd} = \frac{5320}{4 \times 2.5 \times .874 \times 15.5}$$

= 39 lb. per sq. in.

The balance of the design is similar to the design of the wall with level top surface.

L. Goodman, C. E.

Country House Details—III

By A. Benton Greenberg
Architect

Sills should always be bedded in mortar, to give an even bearing at every point. They should also be set back at least 1 in. from the outside face of the foundation wall, to allow for the proper finish of the sheathing and water table. Sills are commonly composed of 4 x 6, 6 x 6 or 6 x 8-in. timbers, the larger sizes being used for walls in which there are many small or several wide openings in the underpinning. In exposed situations and in dwellings in which the ceiling of a basement is more than 5 ft. above grade, the additional precaution must be taken of securing the sill to the wall with ½ or ¾-in. bolts, about 30 in. long and set from 8 to 10 ft. on centers.

Fig. 1 shows a sill made up of two timbers of different widths, thus providing an excellent seat for the joists. Floor beams should not be notched more than one-sixth of their depth from the bottom, otherwise they are liable to split along the line of bearing. Hence, the practice of using a sill made up of timbers of different cross section, is to be highly recommended. The bricks set in between the joists to the height of the floor beams, act as a fire and vermin stop.

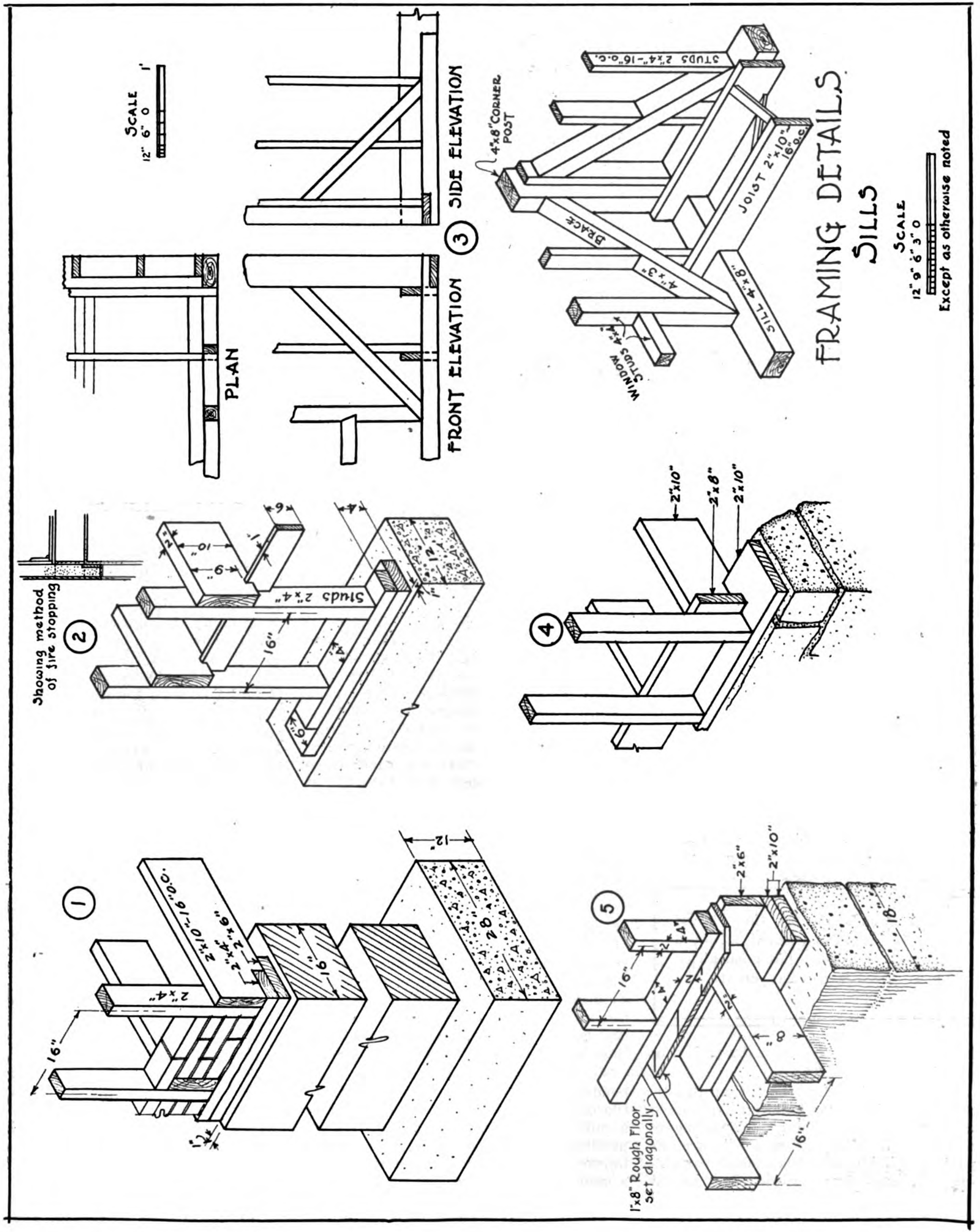
Fig. 2 shows the framing of the lower part of a house in which the foundation wall is almost flush with the grade and the first tier of beams well above grade. The insert in the upper part of this figure illustrates a method of fire stopping the wall.

A typical arrangement of the members of the lower part of a braced frame house is represented in Fig. 3. The timbers are heavy and all are mortised and tenoned into one another. Although very rigid, this construction is too costly. It has been superseded by the balloon frame construction.

The introduction of the balloon frame brought about many economies in house construction. One important improve-

ment was the box or built-up sill, which did away with the heavy and expensive 6 x 6 or 6 x 8 in. solid timber of the braced frame and substituted timbers of lighter dimensions. Figs 4 and 5 are examples of the box type of sill. The one shown in Fig. 4 consists of a 2 x 10 in. wall plate laid flatwise, with an upright, the upper end of which is flush with the upper end of the joist, resting upon the wall plate. The spaces between the studs should be filled, at least to the height of the floor beams, with mineral wool, brick or other incombustible material. This filling not only acts as a guard against fire and vermin, as previously explained, but also as an insulation.

Fig. 5 has the following advantages: The 2 x 6 in. vertical member gives a good nailing to the rough diagonal flooring. The 2 x 4 in. shoe, upon which the studs rest, affords an excellent nailing surface for the base after the plaster is applied. It is a substantially constructed sill, wind-proof, vermin-proof and proof against the ravages of settlement due to the shrinkage of fresh timbers.



Helpful Suggestions to Property Owners Will Build New Business

The Jobbing Department of Big and Little Builders Is of Paramount Importance—Ways to Build Business for It

By Robert F. Salade

Within the last two decades progressive master builders have been giving closer attention to the "jobbing" branch of their business than in the past. Many of us can look back to the time when the average builder considered jobbing, or remodeling work, as merely a small side-issue of the trade. There were even some builders who did not care to "bother" with orders for repairing, remodeling, renovating, etc. New work was then considered to be of the first importance. But, to-day, the jobbing department is one of the main features of every builder's business.

There are several good reasons why the jobbing branch of the trade has reached such a high plane during the last few years. In the first place, the builder who conducts a first class jobbing department never finds it necessary to worry over "slack" seasons, as he is always in a position to "create" as much new business as can be handled. In the second place, it does not require great sums of money and large forces of craftsmen to operate the jobbing department, which would be the case in new operation work. In the third instance, jobbing orders are quickly completed, and the builder does not have to wait long for his money.

These are some of the reasons why the jobbing branch is of excellent advantage to any builder, no matter how extensive or how limited his volume of business may be. Another advantage is that the jobbing department serves as a powerful advertisement for the builder's business in general. It aids in making the builder's name widely known all over his locality. It is often the direct means of gaining orders for new operation work. Still another strong advantage of the jobbing department is that it keeps the builder and his helpers busy during all months of the year.

The foundation for the success of a Jobbing Department is not a big staff of experts but good ideas. These ideas are what create the business.

It is an interesting fact that practically all of the large building firms have well-organized jobbing departments which are in charge of men who are experts in all kinds of remodeling, repairing and improvement work. In "the old days" the builder used to have printed in small type on his business cards and office stationery the words, "Jobbing of All Kinds Attended To." No attempt was made then to advertise this branch of the trade prominently. But, now see how the big, successful building concerns advertise in the newspapers, and by other means, that their jobbing department is one of the most important lines of their business!

Now for the smaller builder to have a first class jobbing department, it does not mean that it is necessary for him to have a large force of experts, a big shop and a suite of handsome offices such as possessed by many of the well-known building firms. These are things which may come along naturally later on. The principal requirement is *good ideas* on the part of the builder, and a couple of clever, all-round craftsmen who are capable of doing any kind of small, improvement work at short notice. With this "equipment," the smaller builder is in a position to advertise that he had a jobbing department of the highest order. He then "creates" business by offering helpful suggestions to property owners.

The following paragraphs will give the reader an idea as to how the "new-thought" builder makes business for himself by offering suggestions in the way of property improvements to trust companies who have homes, etc., in their charge; city officials; business concerns; historic societies, and private owners. Any builder in any city can adopt these business-building ideas with the best of results.

In every city of fair size there are certain old buildings which are of historic interest. Sorry to say, however, some of these structures, through the neglect of the city officials, or the societies who have the care of them, are sadly in need of repairs. The wood-work is in need of renovating; the stone or brick-work is in need of repairing and pointing; the roofs, spouting, etc., are in poor physical condition. At the cost of a few hundreds of dollars a building of this type can be put in excellent shape, and can thus become an ornament to the town.

At the present time grand old Independence Hall, of Philadelphia, is being thoroughly renovated on the exterior by a builder who makes a specialty of repairing historic buildings. All of the improvements are being made in such a manner as to not change in the slightest detail the original lines of the famous structure. This kind of work is an art in itself, and it should be entrusted only to a builder who is an expert in such work. The average good builder, of course, is capable of doing a contract of this class.

Philadelphia, as it is well known, is exceedingly rich in historic buildings. The majority of these buildings have been renovated during the last few years under the watchful eye of the Historic Society of Pennsylvania, and in some instances the improvement work was done through helpful suggestions of progressive builders. The writer knows of at least one case where a fine old Colonial residence, of historic value, was saved from decay through the efforts of a certain builder. This builder kept after the society who had the building in charge until he was finally awarded the order to go ahead with the work of renovation.

Often indeed are historic buildings allowed to go without repair of any kind. If you go to those in official charge of such buildings, you are likely to start a movement which will cause these buildings to be repaired, you of course securing the work. In addition, the amount of publicity afforded by such jobs is very great.

The Edgar Allan Poe house, which stands on North Seventh Street, near Spring Garden Street, Philadelphia, is in a fair state of preservation, but the front of the building is not the same as when Poe lived there back in 1838. This is mentioned to prove that there are always opportunities for builders to offer suggestions for the correct restoration of historic buildings.

Mr. Master Builder, do you get a "hint" from these paragraphs? How about the historic buildings in your city? Are they in a first class state of repair, or are they rapidly decaying through the want of a little renovation work? If they are in poor shape, why not make out a careful estimate of the cost of the essential improvements, and submit the estimate to those who have official charge of the buildings? You are conferring a public benefit upon the people of your city when you offer suggestions which may be the means of saving historic structures in the locality. It is a fact that in many instances buildings of this character are allowed to fall into ruins through the neglect of those who are responsible for the care-taking. The writer

knows of a rare old public building in Philadelphia which has been permitted to run into decay. The same conditions can be found in other large cities. Master builders should look into such cases.

There is in Philadelphia several firms of builders who are making a specialty of converting stately old dwelling houses into modern business buildings of artistic design. On Walnut Street, near Broad Street, for example, one large three-story house has been changed over to an elegant tailoring establishment—the new front of white marble, in the Colonial style, and the hallway and the parlor finished in polished white marble. Another old Walnut Street residence has been converted into an art shop by putting in a new front of stone and by making certain changes in the interior.

On North Broad Street, near Diamond Street, where there are some of the best private homes in the city, two mansions have been taken over by a prominent undertaker, and a remarkable change has occurred in the buildings. The new front has been built of granite, in an exceedingly handsome design embodying attractive decorations. The interior has been remodeled to correspond with the style of the front. The effect is delightful. The spacious parlor and display-room are illuminated during the evening with indirect lighting fixtures, and many people stop to enjoy the pleasing scene. The best feature of this splendid undertaking house is that the beautiful building has not in the least injured the quality of the neighborhood as a residential section.

Not far away from the undertaking establishment which has just been referred to is a handsome bank building which had recently been used as a private mansion. The change was made by putting a stone front in place of a brick-and-brownstone-front, and by remodeling the interior. The original construction of this house stands with the exception of the new stone front, and the building is certainly an ornament to the district. There are several other mansions along this section of Broad Street which have recently been changed over to buildings for fraternal organizations, a fine drug store, an exclusive millinery shop and other business buildings of the better class.

Old houses whose style and usefulness are no longer of the present day form a fruitful source for repair and remodeling jobs. Profits can be made for the owner of such a structure by the builder who possesses good ideas.

On Twelfth Street, near Pine Street, Philadelphia, a wonderful transformation has come over two three-story brick-front houses which had recently been occupied by private families. The brick fronts, up to the second story, have been removed. In their place has been built a handsome front of granite, trimmed with artistic ornaments of the Italian style. Instead of two doorways there is now one—a spacious one with granite pillars on either side. The first and second floors of the two houses have been changed over into commodious saloon parlors. Over the doorway, cut in the granite arch, is the name of the place—the name of the best-appointed Italian restaurant in the Quaker City.

We could continue on this subject, and could fill many pages of this magazine with descriptions of various buildings in the City of Brotherly Love which some few months ago had been private dwelling places. We have mentioned merely a few instances to give an idea as to how easy it is to convert a substantial, old house into a sedate business establishment at comparatively small expense.

It is well for the builder to emphasize in his "selling argument" the fact that a change such as was made for the Italian restaurant always adds to the real estate value of the neighborhood. A transformation of this character adds life, interest and beauty to the district, and therefore makes it a better neighborhood from a residential standpoint. The conditions would be reversed, of course, if the homes had been converted into mills or factories. And, yet, there are sections of large cities that could be bettered by removing courts and alleys, and rows of dilapidated houses, and building modern factories in their places.

The builder who desires to make a specialty of converting private houses into business places should make it a rule to study the sociological conditions of each neighborhood. He should always have in purpose the uplift of the district, for with the right thought and plans the builder is capable of raising the character of a business or residential section to a higher standard. Think of the wonderful field for the builder with good ideas in any large city! There is no end of opportunities. Here, for instance, is a neighborhood containing many two and three-story homes along streets or avenues which offer great possibilities for first class business establishments. That old, brick-front house at the end of the row would make a fine little bank building with a few necessary changes. And that old mansion in the center of the block, which has been vacant for many a day, would be just the place for a music conservatoire.

Why, there is "romance" and prosperous business on every side for the builder who is ready to make use of his imagination. What is more interesting recreation during an evening than in strolling through the various sections of a town or city, and noting here and there the improvements which could be made in certain buildings? Jot down your ideas on paper. Get in touch with your friend, the architect, and have an exchange of ideas. Have rough plans drawn for the proposed work of improvement. Call upon the owner of the property. Show the plans, and explain how the change would be the means of earning more money for the owner.

The trust companies who have charge of houses and other properties are not hard people to do business with, especially when the builder is in a position to offer suggestions which would be the means of increasing the value of the properties in question.

Enough has been said in this article, Mr. Builder, to prove that your jobbing department is one of the most important features of your business. Secure all the orders for new work within your power, of course, but do not allow your jobbing branch to become merely a small, side-issue of the trade. If you have not the time to devote to the jobbing department, put it under the charge of a bright man who knows how to secure plenty of business for it. Keep advertising the fact that you are in a position to do all kinds of remodeling, repairing and renovating.

The Housing Situation in Germany

Apart from the devastations of war in the extensive battle zones, Europe is faced with a severe shortage in houses on account of the general cessation of building operations since the outbreak of hostilities. Every year the war is prolonged it increases this shortage and intensifies the problem that awaits solution on demobilization. A general estimate of 175,000 houses is given as the shortage in the United Kingdom, due solely to the cessation of building, at the end of 1917. Moreover, additional requirements in a normal year are given as 75,000. That the housing situation in Germany is acute is putting it mildly. Official reports emanating from Germany state that there will be at least 60,000 dwellings required for returned soldiers, wives and widows. This number will be increased by 20,000 each year. This demand cannot be met by emergency expedients, such as the use of garrets and basements, old railway carriages and barracks. The only method is to build new houses on a large scale.

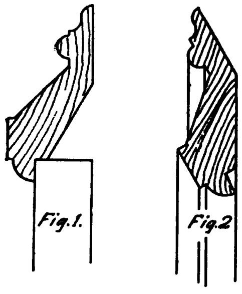
In order to deal with the difficulty the representatives of the municipalities and districts of Germany have, according to the *Berliner Tageblatt*, decided to bring about an amalgamation of the municipalities and communal associations. Housing bureaus have been established in many of the larger cities. In some cities steps have been taken to curb education so as to relieve the housing shortage. Schools and vacant shops have been converted into small dwellings.

The first legislative step in Germany has been taken by the State of Prussia, where a housing law came into force on April 1. An imperial housing census was made in May of all cities having a population of over 5000. All housing departments in city councils have been enlarged and money has been set aside by each in a way to meet the housing shortage.

Some Echoes of the Noon Hour—XVI

Making Picture Frames and Fancy Boxes for Xmas Described for the Kid's Benefit

By Edward H. Crussell



Figs. 1 and 2.—A piece of wainscot cap which the kid mitered flat, as shown in Fig. 2.

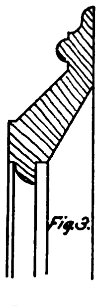


Fig. 3—Correct way to fit the molding.

The Kid, withdrawing himself from the others, had been earnestly employed during the noon hours of the past few days, sawing and hammering on some project of his own. This was so unusual that Scotty was finally led to hunt him up and ask, "Why all the industry kid? What is it you think you're doing?"

The Kid hesitated for a time, but finally explained, "It's like this: The Red Cross people are going to hold a bazaar in a store down town, and they want some small articles for sale. I thought I might be able to make a picture frame, or a couple of small handkerchief boxes, or something of that sort to donate to them; but up to the present I haven't had much luck with anything I've attempted. The Old Man said I might have anything I wanted out of that pile of scrap that is up in the loft at the shop; I've been trying to make a picture frame out of some of these pieces of moldings, but I can't seem to get it to work."

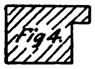


Fig. 4 — A molding that is better suited to the making of picture frames than the one shown in Fig. 1.

Fig. 5 — T & g sheathing can also be used to make picture frame mouldings.

He indicated some pieces of ash wainscot cap of the section shown in Fig. 1; this he had mitered together flat, as shown in Fig. 2, thus leaving no room in the rabbet for glass or back board. Scotty showed him how to set the molding in the miter box so as to fit it together, as in Fig. 3, but then suggested: "I wouldn't use that stuff for a picture frame anyway if I were you, Kid. It's hard to put together, and when you have it together it doesn't make a job. It's the wrong way round; picture frames should have their thin edges next to the glass. Why don't you use a small square-edged molding like this? (Fig. 4). It looks much the best for small frames, and is easy to make, either with plow or rabbet plane. Or if you don't want to plow out the rabbet, take some of that T&G sheathing, rip it to the width you want, and take off the back side of the groove with a chisel, leaving a molding as shown by the shaded section in Fig. 5. Some of that ash wainscoting treated in that manner and given a coat of dark stain and a coat of wax, could be made up into small frames that would be suitable for many kinds of pictures or photos and be sure of a ready sale. Tell you what I'll do; you rip out the molding and stain and wax it, and I'll miter the frames and nail them together for you."

"Thanks," said the Kid. "That'll help some; I'd about given up the idea of making anything. I tried some small boxes first, but I made a worse job of them, if possible, than I did of the frames. I wanted to make a box about 6 in. square and 4½ in. high. One that would be suitable for handkerchiefs or small trinkets; but I had all kinds of trouble, the corners wouldn't fit, and when they did fit I couldn't fasten them. After I did manage to get the bottom part of the box together it was just as big a job to make the lid, which was always either a little too big or too small to fit correctly."

"How did you fit the corners?" asked Scotty.

"Like this," said the Kid, fetching a small misshapen box out of his tool chest and handing it over.

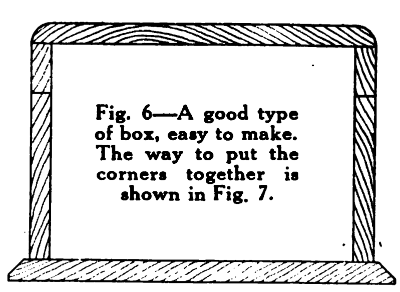


Fig. 6—A good type of box, easy to make. The way to put the corners together is shown in Fig. 7.

"Ah!" said Scotty, "just so; what do you suppose is the use of mitering the corners of a box together if you are going to fasten it with nails? Small boxes *can* be mitered together, but when they are some other method than nailing should be used for fastening the joint. If you are going to use nails a simpler form of joint should be used with them; more especially when the average person is utterly unable to tell the difference between one form of joint and another. You shouldn't try to make the lid and bottom separately either; that's too much work, nearly as much as making two boxes."

Scotty took out his pencil and in a few minutes drew Fig. 6 on a piece of board.

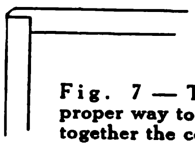


Fig. 7 — The proper way to put together the corners of the box shown in section in Fig. 6.

"That," said he, "is a cross section of the sort of box you ought to attempt, and this (Fig. 7) is the way the corners should be put together. This rabbeted corner joint is easy to make, and if the edge is rounded off as shown it serves to hide most of the end grain. Rounding off the edges of the top does the same for it, and letting the bottom project hides the joint and forms a suitable form of base; ⅜ in. material is heavy enough and ¼ in. will be even better. It could be held together with glue alone, but it will be better to supplement the glue with a few very fine brads. If you cut the heads off the brads before you finish driving them and then use a very small nail set (one no larger than the brad), with it's end ground to a chisel point, the nail holes will hardly be noticed. Instead of making the box in two separate pieces make it in one, with the sides as high as the finished box, minus the top and bottom boards. The sides should be fixed together, the top and bottom fastened in place, and then, after the box has been cleaned off a gage line should be run around it the correct depth for the lid, which can then be separated from the body of the box with a fine saw. A few strokes with a block plane will fit the joint, and then you have a lid which not only fits correctly but exactly matches the grain, something of im-

portance, if figured woods are being used. Just one word of caution; be sure the brads used for fastening the top in place are not so long as to be in the way when cutting the lid.

"If you are going to make more than one box, you can introduce a little variety in the way you arrange the top and bottom. The bottom could be made flush with the sides and have a small molding mitered around, the top could be molded on the edge and left projecting slightly like this (A B C D Fig. 8). Butt hinges are perhaps the best, but ornamental surface hinges are the easiest to apply."

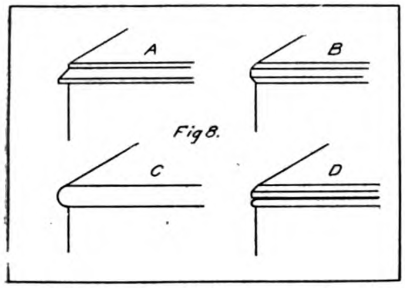


Fig. 8—Different styles of moldings that can be used in the making of small fancy boxes.

Bliss and Old George had joined them during the last few minutes, and the latter now remarked: "That molded edge reminds me of a scheme I used to work in my youth. I was always hunting around for odds and ends of moldings that could be worked up into boxes. Thirty-five or forty years ago our inside casings were nearly always molded, some of them very elaborately, and when worked up into boxes presented a rather striking appearance. I have no doubt you could find some pieces of old casings stored away in the shop, Kid, and though they are too heavy for these small boxes, they might give you an idea for something larger, such as a sewing box or a box to hold stationery."

"Why," said the Kid, diving under the bench and bringing out two pieces of molding of sections like Figs. 9 and 10, "I did bring over a couple of pieces of old casings. Would these be of any use?"

"Well," replied Old George, "there doesn't seem to me to be many possibilities contained in these two pieces, but they'll serve to illustrate my meaning. This piece (Fig. 9) could be rabbeted on one edge for the reception of the top; then, with the molding cut off the other edge, a molded bottom could be fastened on, when a part section of the finished box would look like this (Fig. 11). The other molding could be rabbeted on both edges, leaving the finished box like this (Fig. 12). The moldings could be cut through on the line A B, to form the lid. If you keep your eyes open you'll find a lot of odds and ends that can be used up in this way. Sometimes it's possible to combine two or more moldings in work of this sort, and if the joining is neatly done the finished work looks well worth while."

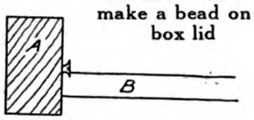
"I might suggest," Bliss volunteered, "that it will make a better finish if you run a small bead around the lid of the box where it joins the body so as to break the joint. A small bead plane for this purpose can be made with a No. 10 flat-head screw, fixed in a block of wood about 1 in. by 1½ in. by 3 in. long. This affair, worked like a gage, will form one side of the bead, the other side is formed with a stroke of the plane and a little rubbing with sandpaper." (Fig. 13 is an end view of Bliss' idea, A being the bead plane and B the piece of wood being worked.)

"Yes," said Scotty, "I was going to mention that. That is the way to work the small bead on the lower edge of this edge molding (D Fig. 8). It is hard to work a bead plane across end grain, but Bliss' little makeshift will do the work quite easily."

"Thanks everybody," said the Kid, "I'm much obliged; who'd think there was so much to know about making so simple a thing as a box Now if one of you can help me out with just one more thing I'll be set up. I want to line the boxes on the inside with satin or something of that sort, so as to give them a better finish, but every time I've tried it I've made an awful job of it. The glue will stick to everything but the lining, and the lining will stick to everything but the box. I wanted to put cotton in behind the satin so as to make a padded lining, but with or without the cotton I found the job equally impossible."

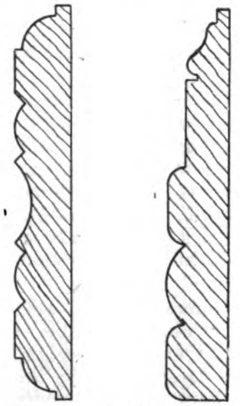
"I just happen to be able to help you there, Kid," said Scotty. "This is the way to do it: Cut some pieces of card to fit the sides, top and bottom of your box. Spread the proper amount of cotton on the face of the card, cover it with a piece of satin, turn the edges of the satin over onto the back of the card and glue them down. After the glue has set the cards can easily be glued inside the box. If you want a particularly fancy job, the satin can be quilted on a sewing machine after it has been glued to the cards."

Fig. 13—A kink that shows how to make a bead on a box lid

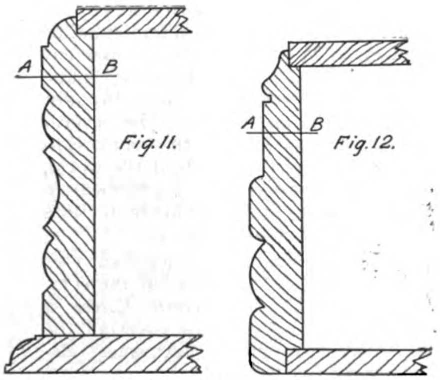


"Gee!" said the Kid, after a moment's thought. "What a difference it makes when you know how, doesn't it? Here I've been puttering around all my spare time for three days, accomplishing nothing and getting more disheartened the further I went. A little while ago I was about to give up in disgust, and now I feel like asking the Old Man for the afternoon off so as to be able to use up some of my new information."

"That's right, Kid," agreed Old George. "Most of the difficult and disheartening work is in learning how, and if you'll just remember that you'll find it'll help some."—*To be continued.*



Figs. 9 and 10.—Cross section of casings which can be made into boxes as shown in Figs. 11 and 12.



Figs. 11 and 12—Using casings to make fancy boxes. Different ways of making the joints are illustrated. These illustrations show some of the possibilities in short lengths of casings, etc.

Novel Fence Built Without Posts

A fence that has no posts is cited by a lumber expert as an object lesson in the utility of wood. This fence without posts is located on the big road near Monroe, Iowa, and has long been a point of interest to travelers in that section.

Years ago, so many years ago that nobody knows when it was, nor who was the labor-saving genius who did it, this fence was built by forcing split boards between saplings. Then the trees grew.

They kept on growing until to-day they are of immense size, and deeply imbedded in them are the ends of those old rails. It is impossible to tell how deeply they extend into the tree trunks. They are weathered and yet they ring as true and sound under a hammer as though just hewn.

It so happened that the trees formed a boundary line for one of the old tracts. The rails were arranged in rows about a foot and a half apart, to a height of 5 ft., and in this position the trees grew up, and around their ends, until one of the most substantial fences imaginable has been created.—*Exchange.*

Department of Masonry Construction

CONCRETE, BRICK, ETC.

Practical Ideas Which Will Help You Do A Quicker and Better Job

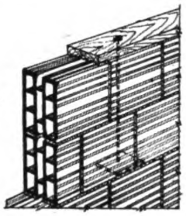


Fig. 50—Fixing the plate on a hollow tile wall for the rafters. The plate is bolted down as shown.

How to Build and Fireproof with Hollow Tile—VIII

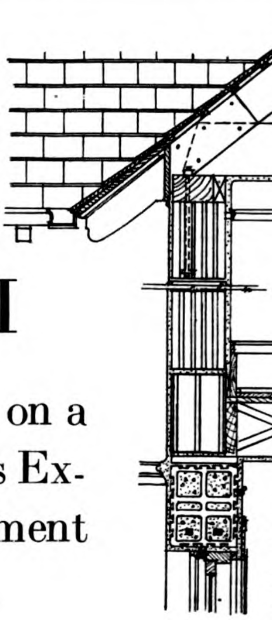


Fig. 51—Section of wall showing framing of rafters, attic joists, etc.

Putting a Pitch Roof on a Hollow Tile Building Is Explained in This Instalment

By J. J. Cosgrove

What little thought is given to the roof of a building! I mean, of course, by the average man in the building line, even those who have the building of roofs as part of their work. To most people the roof is merely a shelter from the elements. It keeps out cold and rain, snow and hail, and protects from the merciless heat of the sun in summer weather.

That of course is the function or use of a roof, but how many have thought how the function and service affect the design? Everything in building practice has a use, else it looks strange and out of place, and the 57 varieties in shape and design of roofs has been brought about by different needs in the several parts of the world. If the same conditions obtained in all parts of the world, there would never have developed in practice so many different kinds of roofs and so many varieties of detail.

In tropical climates a thatched roof fills the simple requirements of the common people. In the Arctic Circle a domed roof of ice or snow covering the iglo marks the opposite extreme. Between these two extremes can be found any modification almost that is desired. Have you ever asked yourself why a pitched roof? Why a flat roof would not serve for all purposes outside of architectural effect?

There are several reasons for the pitched roof. A flat roof will shed water, it is true, but a pitched roof will shed it quicker and with less danger of leaking. A better and more costly covering is required on a flat roof, for an ordinary shingle roof on a flat pitch would leak like a sieve with a driving rain falling on it. Economy, then, makes a strong plea for a roof of decided pitch.

Snow is likewise a modifying element in the design of a roof. In regions where the snowfall is heavy, a pitch roof, while not an absolute necessity, is in the highest sense desirable. In such regions the roofs are made of sufficient pitch so the snow will slide off when a fall of a few inches has accumulated.

Let us see what the effect would be of a heavy fall of snow on a flat roof. Suppose, as often happens, a fall of from four to six feet of snow should accumulate on a roof, then be followed with a rain storm, the water falling on the roof being held by the snow where it might remain in a slushy condition or freeze to ice.

This would impose such a weight on the roof that it would be liable to give way, unless that excessive weight were taken into consideration by the designer, and a roof built much heavier and stronger than would be required if it were pitched. That, of course, would add to the cost, while a mass of ice on the roof of any building is not good, to say the least.

We can see, then, the necessity for a pitch roof in cold climates, but why a pitched roof in warm regions?

Protection from the elements again dictates the use of a pitched roof for economy, comfort and safety. By using a pitched roof in warm regions an air space is provided above the top floor so that the building will be cooler in summer and warmer in winter than if a flat roof were built close to the top floor ceiling. This feature is likewise of value in cold climates, for it keeps the buildings warmer than if the roofs were flat.

The climate of a locality is the chief

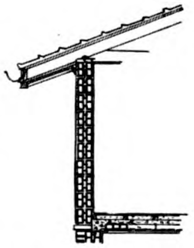


Fig. 52—Pitch roof with box cornice, the wall being hollow tile stucco coated.

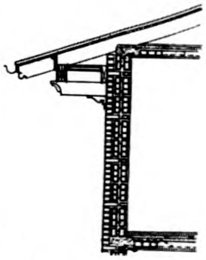


Fig. 53—A roof similar to that shown in Fig. 52, but with slightly different finish of eaves. The wall is hollow tile and brick veneer.

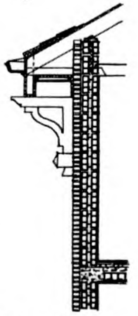


Fig. 54—Box cornice with ornamental brackets.

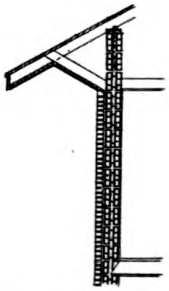


Fig. 55—Heavy overhang braced with brackets.

modifying characteristic in the design of a roof or cornice, and by climate is meant more local conditions than the temperature due to the region. For instance, in a part of the country swept by strong winds which rise at times to tornado or hurricane velocities, buildings would be designed with the narrowest cornices, the least projections consistent with good design and practice. Many buildings on or near the seashore have been unroofed or wrecked on account of a wide projection to the roof which gave the wind a good uplifting hold.

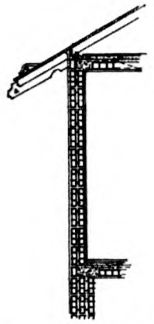


Fig. 56—Light roof construction with a type of standing gutter.

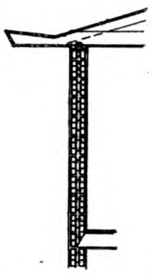


Fig. 57—A type of roof construction where the attic joists are extended and trimmed to form a gutter.

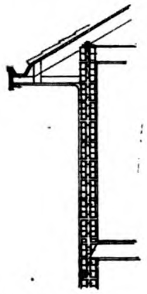


Fig. 58—Another type of gutter.

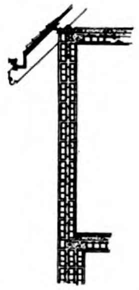


Fig. 59 — Built-in gutter with box cornice.

In a warm sultry region where the sun beats down unmercifully and the air seldom stirs, a great wide overhang to the roof in the form of a cornice protects the inmates just as the wide brim of a hat protects the face. A pitch roof, too, adds to the comfort of such a building, providing an air space above the living rooms, and by providing suitable ventilators to keep up a circulation of air, the building can be made quite comfortable for the occupants. While a pitch roof is desirable, it need not be a steep pitch, for no snow will fall in such a locality, or if it does, in not sufficient quantity to be dangerous. The roof, then, like all other parts of a building is not without interest, and the methods followed in practice are not the result of accident or haphazard growth, but have had their origin in well established and good practice.

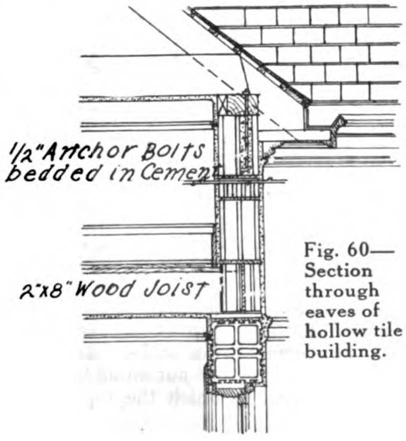


Fig. 60—Section through eaves of hollow tile building.

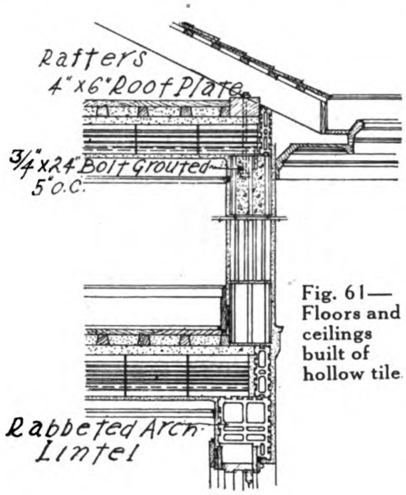


Fig. 61—Floors and ceilings built of hollow tile.

Turning now to the practical or building side of the question, it might be well to point out that the heel or roof rafters should never be allowed to rest on top of the top tile of a wall. If the rafters were so installed, there would be no support, one to another, and no cohesion between the walls and the roof. A stress at one point, then, would be liable to cave in the roof at that point instead of spreading the stress over the entire roof surface, while, on the other hand, it would be almost impossible to maintain a straight line in the cornice, which would be full of short waves, due to the unequal stresses at different parts of the roof.

In erecting a frame building a plate is provided at the top of the bearing walls to which the rafters are spiked. In a hollow tile building a similar plate must be provided. The manner of doing this is shown in Fig. 10. Steel or iron bolts are bedded in the wall at intervals of a few feet, a plate, the full width of the wall is bored at the proper intervals to slip over the bolts, washers are dropped in place and the nuts screwed down, securing the plate firmly in place.

A section through the wall of a building showing the plate in place and a rafter resting thereon is shown in Fig. 11. It will be noticed that the floor joist or collar beams are fastened to the plate and rafter at this point. A tie beam of some kind is necessary to keep the rafters from spreading and to give stability to the top part of the wall. By tieing all the members together in this way, a plate to the wall, rafters and collar beam to the plate and together, then the collar beams to the floor joists below, by means of partitions, it will take a strong lifting power in wind to tear the roof from the building. The following illustrations show pictorially the different kinds and pitches of roofs generally used with hollow tile. By studying them a mason or builder can select the style best suited to his work.

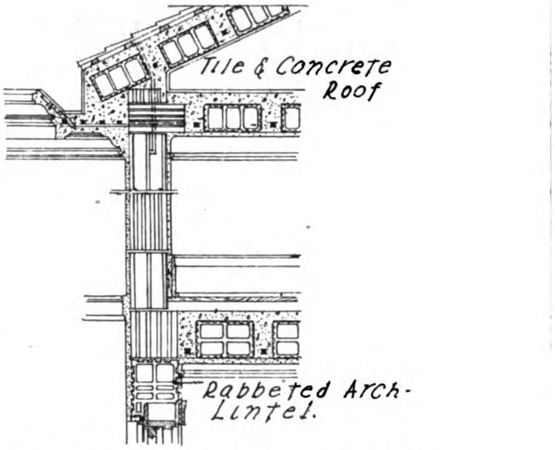


Fig. 62—An all tile and concrete roof and gutter.

Fig. 52 is a simple pitch roof with metal eaves trough and box cornice. The box cornice makes a very neat finish. Fig. 53 shows a similar roof without box cornice but with the ends of the rafters dressed and exposed. It may be ornamented or not as seeems best with the brackets illustrated. Fig. 54 is a deep box cornice with large bracket supports and wooden eaves troughs. This is a rather heavy and expensive design and not suitable for the run of buildings. Fig. 55 is an unusually large overhang well braced with rough covered brackets to the wall. It has no eaves trough or gutter, although either may be supplied. Indeed, any type of gutter or eaves trough may be used with the designs shown here.

Fig. 56 is a light roof construction with roof gutter. Fig. 57 introduces a new type in which the roof joists are trimmed and extended to make an overhang for the cornice, and a depression for the gutter. Fig. 58 shows a steep pitch roof with a cut-in gutter, the ends of the rafters being dressed and exposed. Fig. 59 is a built-in gutter with box cornice and large overhang.

Fig. 60 shows a section through the eaves of a building, illustrating the relation of the various parts. It will repay well a careful study. Fig. 61 shows the same type of roof but with less pitch, adapted to a building the top floor or ceiling of which is built of hollow tile blocks. Fig. 62 shows the construction of an all tile and concrete roof and gutter and gives enough detail to enable the resourceful builder to construct a similar one.

(To be continued)

A Novel Flower Box Built Into the Chimney

By Albert Marple

Here is one of the most novel flower holder features for the home to thus far make its appearance in Southern California. It is what has been termed the "double flower box feature for the chimney." And it is just what its name implies, for it consists of two flower boxes attached to the cobblestone chimney, one being located several feet above the other.

Probably the most unique point about this flower holder feature is that both of the boxes have the effect of being held in place by heavy chains, the upper ends of which are connected to the extension of the heavy roof beams. The truth of the matter is, however, that the 4 x 12 timbers, which form the ends of the flower boxes, were inserted into the cobblestone and cement work during the construction of the chimney, and these alone support the boxes. This fact, however, cannot be recognized by the passerby.

Each of these boxes is 12 in. deep, extending about the same distance outward from the exterior surface of the cobblestones. The lower holder is about 6 ft. in length, while the one above is 5 ft. long. When this holder is filled with earth it furnishes an ample opening for the growing of flowers or vines. The timbers of which these holders were made were left rough so as to harmonize with the other beamwork about the home.

Beautifying a cobblestone chimney.

Do Chimneys Really Leak ?

By D. P. Barry

There has been much said about so-called leaky chimneys which really did not leak that the following particulars may be of interest to owners of buildings where trouble occurs. About the middle of November I had occasion to go into a store I seldom enter. It was a sunny day with little air moving and the temperature was below 40 deg. The night had been cold, about 20 deg. of freezing. Inside the store was a subdued wood fire. As I opened the door I heard and saw water dropping and I looked up to see from whence it came. A brick chimney was directly above the door, and the creosote was coming down rapidly. There were about 25 ft. of stove pipe in the second story, which was large and cold, having no other heat.

The chimney was probably 35 years old, built of soft brick and arched. The wood was probably wet, as we have had a very wet fall in this section of the country. The water came from the wood and the air. It was condensed in the pipe and chimney. It was noon when I entered, by which time the brick had absorbed all the water they could hold and from that time on the water would run till the second story and chimney had become warm enough to stop condensation.

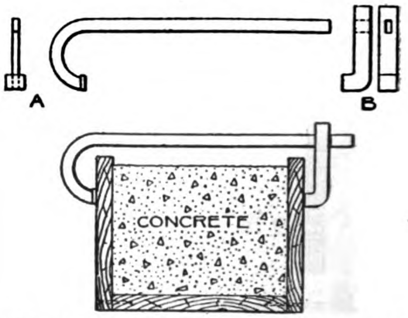
The chimney is on the south end of the building. These facts, though common, taught me a lesson, previously partially learned. The chimney should start from the foundation wall of the bottom of the basement or cellar in cold and damp climates. It matters not of what material the chimney is constructed.

Two of my chimneys pester me with creosote in this way; burning out heats the pipe almost white, to the danger point. They are built of concrete. A brick one I tore down was just as bad. The creosote runs out into the pipes. I am going to start one on the wall, the other on the cellar bottom and build up to the present chimneys. As intimated at the outset, these facts may help the owners of many so-called leaky chimneys, of which I do not believe there is a single one.

Time Saving Clamp for Concrete Forms

An easily constructed clamp for holding the forms in making concrete structures is shown in the accompanying illustration. There are no screw threads to bother with and there is but one moving element. A contractor may have a number of these made by the local blacksmith or machine shop and use them in construction work of any character.

A cold rolled bar, 1 in. by ⅝ in. in diameter and about 3 ft. long, should be heated and forged at one end into the shape shown on A. A short bar, 1 in. square and 10 in. long, should be fastened similar to B. The hole in the latter should be just large enough to allow A to slip through with a close fit. It is the lever action which, pressing the diagonally opposite edges of the hole against the bar A, causes the bar B to wedge and hold.



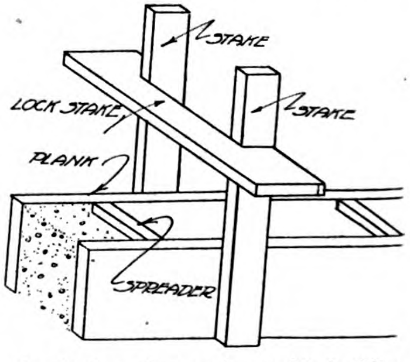
This clamp can readily be moved from one job to another and does away with the necessity for the nailing of wooden cross pieces.

In building a large concrete structure a contracting company used hundreds of these clamps for holding temporarily in position the wooden forms for beams, window sills and stairways. A great saving in time as well as money was made, as they did away with the old method of nailing wooden cross-pieces to the forms. They are easily portable and may be moved from one job to another as soon as the concrete sets.—*Exchange.*

A Curb Form Kink

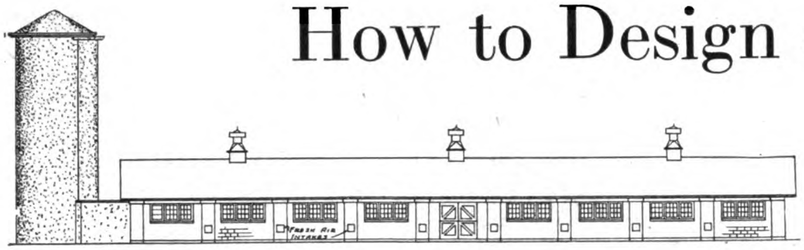
By Scott Healey

In building curbing (not gutter), use stakes that stick above the forms at least a foot, put a spreader between the planks and draw the stakes toward each other and put a lock from stake to stake, instead of nailing a cleat across. The locks are made by notching strips of wood, and are quick to put on or take off, and leave room to finish the top.—*Concrete.*



A handy form that can be used in building concrete curbs.

How to Design a Concrete Dairy Barn



Elevation of concrete dairy barn.

Important Factors Which Will Help to Make the Building a Success.

By H. Colin Campbell

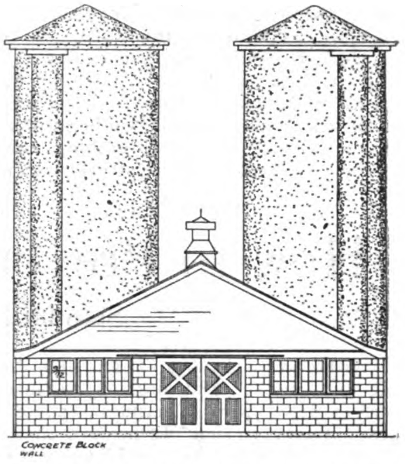
The requisites of a satisfactory dairy barn are that it shall be waterproof, fireproof, ratproof and easily kept clean. Everyone of these requirements is fully met by concrete. Winter storms and summer sun alike have no deteriorating influence. Accidental fire may destroy contents of the barn, but the structure itself will not be injured. Rats cannot gnaw their way through a concrete floor; waste of grain is thereby prevented. Owing to the impermeability of concrete and the even surface which can be secured such a structure can be more readily kept clean than any other type, and it is very important that cleanliness be supreme in a dairy barn.

For the housing of cattle it is necessary that the building also be free from draughts, which means that there must be a proper ventilating system if the health and productiveness of the animals are to be maintained. Floors must be clean and easily kept so; otherwise they provide breeding places for flies, which are not only active germ distributors, but which cause the animals themselves great annoyance, thereby resulting in a falling off of the milk supply. With a concrete dairy barn none of the troubles above mentioned are to be expected. It can be kept warm in winter, always dry, and it can be readily flushed out and disinfected, and the best facilities for feeding and caring for the stock are readily made a feature of the structure.

In planning the cow barn the size depends upon the number of animals to be accommodated. Usually designs are so made that the entire structure really consists of a number of identical units, these units permitting expansion and contraction of the structure as planned merely by adding to or taking from the original design to secure the required dimensions. In view of the special requirements of the dairy barn the interior of the structure should be carefully planned, consideration being given to cleanliness, convenience and comfort of the stock.

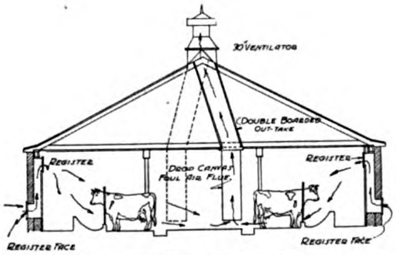
There is considerable difference of opinion as to how the interior of such barns should be laid out. Some insist that the cows should face in; others that they should face out. It seems that either method is largely a matter of choice. One of these methods makes feeding of stock easier; the other makes cleaning of the barn easier, and in either case it is about 50-50 as to which method shall be adopted. It is important that mangers be of concrete and that gutters and floors also be of the same material. Only in that way can the structure be kept sanitary. Floors should be of one-course construction and should be finished with a wood float so that the surface will have a gritty texture that will prevent animals from slipping. Stalls for single cows should be about 3 ft. 6 in. wide. The depth of the stall will be in accordance with the breed of animals kept.

Stock raisers who have had considerable experience with concrete floors claim that animals suffer no ill effects from standing thereon if kept properly bedded. Rheumatism and other complaints often raised as objections to concrete floors by some dairymen have their origin probably in draughts or poorly ventilated structures and in concrete floors that are not laid so as to be dense and watertight. In other words, the floors cannot be kept dry. However, any objection to allowing animals to stand on concrete can be taken care of by installing on top of it any one of the several types of wood or cork block floors intended for that purpose.

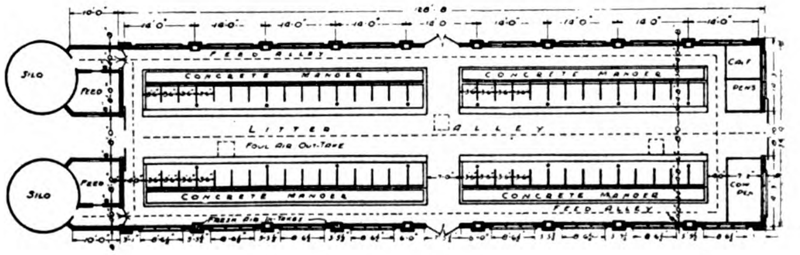


Rear elevation of dairy barn and silos built of concrete.

The gutters back of stock should be connected with tile drains that in turn lead to a concrete manure pit, where all



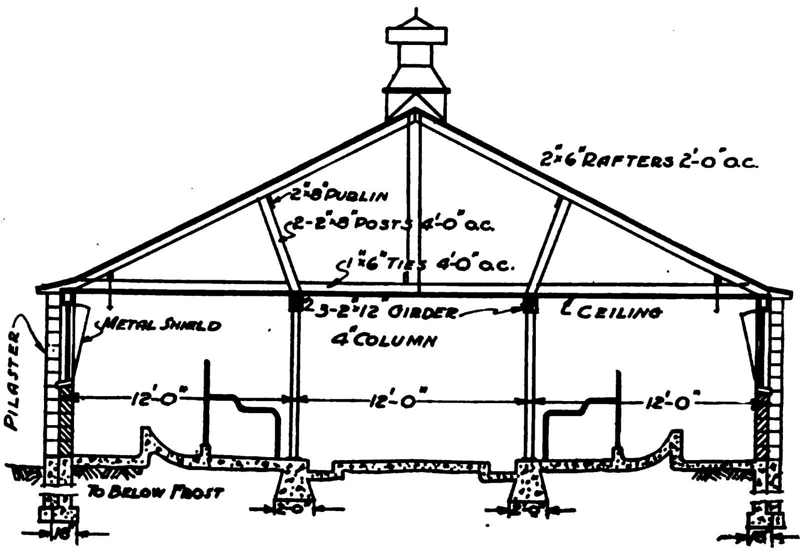
Cross section of dairy barn illustrating the ventilating system.



Plan of concrete dairy barn.

of the stable waste can be conserved. Fertility of the land depends in a large measure upon the amount of fertilizer which is put upon it, and in these days when the chemical fertilizer situation is so serious it is criminal to neglect that simple conservation of manure to save every bit of stable waste.

In the accompanying plans it is contemplated that the walls of this barn be of concrete block construction. However, the plan can readily be adapted to monolithic construction without change, the only difference being that the monolithic wall will require reinforcement while the block wall will not. Footings should extend well below frost line and walls should not be less than 10 in. thick. If plastered on the inside it would be better to fur out from the wall and apply plaster to the lath attached to this furring, although with a proper ventilating system there is no need to fear condensation or moisture on the walls. It is the lack of ventilation that causes interior wall faces of stock buildings to become moist when differences exist between indoor and outdoor temperatures. Moisture exhaled by the breathing animals is condensed on the relatively colder surface because of lack of ventilation, while with a thorough ventilating system the air is changed with sufficient rapidity so that the moisture laden air is carried away and replaced with fresh air from the outside.



Cross section of barn, showing general arrangement of gutters, etc.

How to Prevent Concrete Floors from Dusting

Standard Practice in Concrete Floor Construction

By Expert

Concrete has come in from time to time for unjust condemnation because concrete floors have sometimes rendered unsatisfactory service. In modern office, factory and warehouse buildings floor requirements are exacting. There is considerable trucking, which subjects the floor to severe use, and unless the concrete is of first class quality the handling and pounding of loaded trucks cause the concrete to wear away if not crumble and disintegrate.

One of the commonest complaints made of concrete floors is that they dust; that is, there is a continual wearing away of the cement-sand mortar or surfacing of the floors that is of course objectionable where cleanliness and freedom from dust, such as around machinery bearings, are necessary. Dusting is due entirely to faulty materials or faulty use of good materials. Contributing causes of dusting have been definitely fixed in too fine sand, dirty sand, soft sand, too lean a mixture, bad mixing or insufficient mixing, and in too much time allowed to elapse between placing and finishing. Another cause of dusting is using too dry or too wet a mixture, the latter requiring too frequent troweling, and in that way resulting in breaking up the process of crystallization that takes place when the cement sets or hardens. Finally, good workmanship and good materials may avail nothing if after the floor is finally finished the concrete is allowed to dry out too rapidly; in fact, it should not be allowed to dry out at all but should be kept constantly moist by some protective covering that will insure that the cement has the most favorable conditions under which to undergo its transformation, namely, constant presence of water.

In two-course floors when the thin top or wearing surface is placed on a base which has already hardened there is likely to be dusting because there is no possibility of the base absorbing excess water from the top course, and any excess must get away through evaporation from the top surface. A moment's thought will convince one that if only one successful concrete floor should be pointed out, one free from dusting or any other cause for complaint, there must be a reason or reasons why such result was obtained, and knowing this it should be possible to duplicate this perfect piece of construction indefinitely. Such floors do exist and in large numbers. So the dusty or otherwise unsatisfactory concrete floor is an exponent of the human element.

The fundamentals of one-course concrete floor construction are clean, well graded materials, mixed in definite proportions with sufficient cement to slightly overfill all of the voids in the sand, pebbles or crushed stone, sufficient clean mixing water so that a stiff, plastic mass is formed, one that requires a little more than usual labor to work into place. A concrete that floats and finishes easily is too wet for satisfactory concrete floor construction. It must be a stiff concrete, that will require a good deal of "elbow grease" to bring to proper compactness and surface. Finally, after the concrete has been mixed and placed, the finished work must be kept covered for a week or ten days with moist earth or sawdust or some other water-retaining, protective covering that will prevent evaporation of water used in mixing the concrete. Hot sun, drying winds and similar influences deprive the concrete of the water which is necessary to hardening of the cement.

Floors that are already in service can be treated by one of several methods to prevent dusting, although these treatments being in the nature of surface applications may require renewing from time to time as a result of wear.

Objection has been advanced from time to time against concrete floors on the ground that they are damp. Dampness is usually traceable to poor workmanship in placing the concrete or to the use of unsuitable or improperly proportioned or poorly graded material, thus resulting in porous concrete. For one-course floors a 1:2:3 concrete is certain to produce a dense water-tight floor, and one that if properly protected while the concrete is green will result in a wear-proof floor under ordinary usage, providing, of course, the aggregates that were used are hard and tough. Soft aggregates should not be used in floor construction. It is the aggregates that take the wear as soon as the surface film of cement has been worn off of the exposed top face of the floor. Fine aggregates should consist of hard, silicious sand or screenings from granite or trap rock. The coarse aggregate should preferably be from granite or trap rock.

THE EDITOR'S PAGE

What Will Be Future Building Costs?

The war has held up much necessary building for months past; government restrictions caused almost a total cessation of private activity for two months. This means that there is a large amount of building ready to be launched upon the first opportunity presented.

The coming spring will undoubtedly see a general resumption of building activity, probably even more projects going ahead than was the case last spring. Consequently there is a sure and certain outlet for materials and labor.

The most urgently required projects will certainly be the first ones to take advantage of all relaxations of government restrictions, no matter what prices may be. Less necessary construction will probably be held up for a time awaiting a hoped-for lowering of material prices.

What will be future prices? This, then, is the question that will hold up many a project. The situation is as follows:

Materials will be required by those European countries which must rebuild their devastated cities. Practically every European country of importance faces a building shortage of more or less stringency. There is a huge demand there, one that will require more importing in order to fill the native wants than has ever before been the case.

The United States is similarly in need of buildings of all kinds.

Now, then, with all this accumulated demand, with manufacturers' stocks and yard stocks lower than ever before, is a substantial lowering of prices likely?

No, especially when one takes into consideration the fact that building costs in general have not advanced in anything near the same proportion as have costs of other things, such as clothes and food. Therefore, building costs have not the same reason for falling, and are not likely to take a big drop.

Goods where prices have advanced sharply have been in abnormal demand by the allied governments. Present high wages and prices in those lines have been kept to their level by purchases of the allied governments of about $150,000,000 per day. Coincident with the slacking of this demand, prices must be based on the demand of private consumers. These will not have sufficient purchasing power to maintain the present demand and therefore a lowering in prices with lessened profits or even losses must follow. Wages will then be forced down, for no profit can be made at the reduced selling prices unless production expenses and labor costs are also reduced in proportion.

GOVERNMENT RESTRICTIONS ENTIRELY REMOVED

All remaining restrictions on non-war construction throughout the United States were removed Thursday, Nov. 21. This action allows all building operations of whatever character, suspended during the war, to be resumed. No further permits will be required.

This ruling followed shortly after that which partially lifted the restrictions, the main features of which allowed all buildings or alterations costing under $10,000, schoolhouses, churches, and public buildings, costing not more than $25,000 together with alterations thereof costing under $25,000, and any farm or ranch buildings of whatever cost. This same ruling removed all restrictions on the manufacture of building materials.

The trade will welcome the latest order with the greatest enthusiasm. Buildings of all sorts are in demand and as soon as the present psychological uncertainty is over, construction will rapidly go ahead.

It is probable that the government was somewhat influenced in this step by the necessity of providing jobs for the demobilized troops. The building field with its tremendous but heretofore suppressed demand will furnish a labor market that can do much to absorb all surplus labor.

The optimist, the man who nailed his flag to the mast and refused to quit or be dismayed, will in 1919 and 1920 reap the fruits of his courage. Hard times in the building trades will soon be over, and prosperity will once again rule this greatest of the peace industries.

That is the situation as regards general products, which in nowise is similar to the building situation. Building prices have not been maintained at abnormally high level by the Government except in isolated instances. As a whole, it can safely be said that general building costs would have risen to nearly their present level without any government demand at all.

Labor, especially common labor, will probably be cheaper as the gradual demobilization of the army takes place. Munition workers, who have been the real profiteers, will be forced to seek other employment at greatly reduced wages. Common labor will therefore be lower in the building trades as well as in other lines.

Many house carpenters who turned to shipbuilding, as a temporary expedient, will remain in their places, for the present outlook indicates continued activity in shipbuilding. Other building trades which have migrated to other lines will likely follow suit to a certain extent. Therefore, there is likelihood of a shortage of skilled building mechanics, particularly considering the enormous demand that can be expected, especially in 1920.

As a generalization, labor unions in the building trades will very likely be able to continue to enforce at least much of any advances which have taken place in the past four years. Labor unions in other lines where wages have risen enormously will probably be forced to consent to a general lowering of wages, which in some cases may be comparatively large. This, of course, will follow a decreased cost of living.

It is significant that the Government is planning a general Adjustment Board. This will co-operate with the labor union and manufacturers so as to be able to make just decisions in fixing wages according to the decreased cost of living. It is hoped that this Wage Board will be able to settle disputes without incurring ruinous strikes.

Demobilization of the army is planned only at such a rate as will insure its absorption into peace industries. Plans are being perfected which it is believed will minimize labor disturbance. In fact, the Government seems to be thoroughly alive

to the fact that every effort must be made to maintain stability during the period of reconstruction. This will tend to supply labor only as the demand grows for it, there not being a likelihood of wholesale dumping of labor to the demoralization of its market.

A questionnaire sent out by this company to bankers, contractors, real estate men, architects, etc., showed that the shortage of all kinds of buildings throughout the United States is acute. This questionnaire showed that difficulty in obtaining materials and labor is the only obstacle expected to the filling of this demand, for no difficulty in financing is, in general, looked for. High costs are a factor, but as the realization spreads that wholesale reductions in cost will not take place this factor will be eliminated. Mortgages or building loans will then be more freely made, for there is at present some fear that falling costs may cause a lowering in the value of the security. As soon as the money market realizes that vastly lower costs are not possible, building projects will be liberally financed.

There is, then, a great need, a very great need, for buildings of all kinds. Material manufacturers are far behind in their usual output, since curtailment of production has been enforced on nearly every side; stocks also are abnormally low, lower than ever before.

With this demand growing by leaps and bounds in advance of the supply of stocks and labor, are building costs in general likely to drop far? Hardly, for the accumulated demand will not have spent itself for the next ten or fifteen years. No substantial lowering of general costs can be looked for before then.

Build now, when your finished structure will be in demand. Do not hold off for any expected lowering of costs, for competition in renting and selling will be great after the present demand is partially supplied.

What Is the Future of the Standardized House?

What is the future of the Standardized house? This is a question which is engaging the attention of architects and builders in ever greater numbers.

Standardization in everything is the tendency to-day. Processes and methods are worked out to permit of the efficient employment of the cheaper kinds of labor; costs are being cut by duplication wherever possible; and industries are being placed upon a more efficient and lower cost basis by means of standardization.

Where does the building industry stand in its relation to this tendency? Prominent architects and builders are developing the Standardized House. By duplication of design they hope to cut costs in half.

Let us follow this tendency out in detail and see how its logical development will affect the trade if carried to the utmost possible specialization.

First, it is undobutedly true that designs and plans are being duplicated continuously; an undoubted waste is present in this duplication of architectural efforts in the redesigning of the same house over and over again. Many architects indeed will build several times from the same plans, each time charging the client the full percentage.

The plan foundry steps in at this point and effects economies to a great degree by the elimination of this duplication. The mail order house goes further and effects a saving by manufacturing these houses in quantities, thus obtaining the economical advantages of quantity production. Whether this is at present done efficiently or not is an open question. I have met more than one builder who has told me that his labor experiences with ready cut houses have shown him that the extra time involved in sorting out and gathering together the materials, following of codes in framing, etc., more than offsets any labor advantages effected by quantity production.

This fault, and it is a big one, may well be solved in future years by an extension of corporation or mail order activities to the actual erection of the house, as well as a selling of the materials. By establishing branch construction offices and material yards in various centers it would be possible not only to effect the saving coincident with quantity production but also to effect the greater saving that goes with quantity assembling or erection.

By standardizing designs, by standardizing the shaping of the materials entering into these designs, and by further standardizing the erection or assembling of the materials, undoubted great economies could be effected.

The Ingersoll Thousand Dollar Concrete House, described in these columns a few months ago, is a good example of this tendency to standardize all branches of the architectural, material, and construction fields. In fact, advocates of this particular housing development feel strongly that concrete will win out over wood as the standardization tendency grows greater. It is interesting to note that this concern has recently secured its first contract for 100 houses.

The Austin Company, which specializes in steel structures, is another example of this tendency. This company has standard plans, standard structural shapes, and standardized erection by trained crews.

With standardization such as this there will probably develop a tendency for more stable fashions in house designs. In many localities the house of ten or even five years ago is out of date and thrown in the discard by the fashionably inclined.

Is this standardization a good thing for the trade? If carried to its extreme it will tend to eliminate architects, builders and dealers, as *independent workers*. Instead, these men will be employed by large corporations to do exactly the same work as before, but the process of distribution will be more efficient. Fly-by-night contractors and impractical architects will tend to disappear and the benefits of quantity production become widespread.

Is architecture as an individualistic expression of the owner, then not worth while? An architect writes in a lumber paper "Architecture, as I know it, is a luxury. I burn the midnight bulb to help make it so for my wealthy clients."

The architect who makes mere ornate beauty his aim in order to please a wealthy client is an architectural degenerate. Beautiful architecture often means a compromise between mere beauty and practical convenience, yet the two are *not* inseparable, as a glance at many of the house designs published by BUILDING AGE will testify.

Strongly indeed do I feel that architecture and building, as separate professions, will never disappear in spite of standardization tendencies. The man who can afford to buy, not rent a house, has certain definite ideas that he wants for the personal convenience of himself and his wife. If he can afford it, he will pay extra for those conveniences. Again, just as many a custom made suit is rivaled in fit and material by a ready made suit, but bought in spite of the higher price because of the greater distinction of its possession, just so will the individually designed house retain much of its popularity.

It is no use shutting our eyes to the growing tendency to, first: standardizing plans and designs; second, to standardizing structural shapes; and thirdly, to the standardization of methods of erection.

By realizing and understanding fully these tendencies of to-day it is possible for us to so shape these tendencies as to make them more useful than would otherwise be possible, and yet to maintain our own business individuality by catering to the class which can never be satisfied by standardization.

Building Activity Throughout the United States

With government restrictions now entirely lifted, we can look with equanimity at the poor showing made for the month of October. This was the first month when the restrictions were fully in force.

Figures for the whole country, 156 cities reporting, show a loss of 36 per cent, yet the amount of construction was lower than for any time during the past five years.

The most essential construction only took place in October, and it is surprising that the figures are not lower. The total is $27,573,043, as against $43,211,048 for October, 1917.

The feeling through the trade in general is that no extensive lowering of costs can be expected for reasons explained on the "Editor's Page." Few dissenters from this view are to be found, although a general feeling of caution prevails. The lifting of the restrictions are still of too recent date for the full beneficial effect to be reflected in the trade and with investors.

Increases can be looked for beginning with the December report, published in our February issue.

Eastern cities, 58 reporting with 45 showing losses, show an 11 per cent loss. Middle States, with 36 out of 45 showing losses, report 56 per cent loss. The southern cities, with 28 out of 35 reporting losses, show a loss of 50 per cent, and western cities, 12 out of 18 of which report losses, show a loss of 22 per cent.

The figures in detail are as follows:

CITIES IN EASTERN STATES

	October 1918				October 1917			
	New Work		Repairs		New Work		Repairs	
	Permits	Value	Permits	Value	Permits	Value	Permits	Value
Albany, N. Y.	126	$105,630	...	....	226	$174,120	...	....
Allentown, Pa.	5	30,725	8	3,960	29	72,090	11	5,635
Altoona, Pa.	6	3,865	34	6,295	6	4,646	16	3,005
Atlantic City, N. J.	2	2,200	51	13,504	10	73,695	96	41,749
Auburn, N. Y.	13	20,475	...	....	15	5,625	...	....
Bayonne, N. J.	7	9,760	...	....	15	69,300	...	....
Binghamton, N. Y.	41	15,004	61	7,291	80	215,796	160	28,071
Boston, Mass.	30	227,575	346	220,873	59	169,660	359	358,851
Bridgeport, Conn.	80	92,444	...	....	133	208,315	...	....
Brockton, Mass.	6	11,170	6	5,700	27	42,283	23	15,040
Buffalo, N. Y.	216	328,000	55	61,300	329	1,014,000	...	....
Easton, Pa.	1	1,200	8	7,028	14	47,950	12	13,187
East Orange, N. J.	25	30,634	...	....	45	78,215	...	....
Elizabeth, N. J.	17	46,919	...	....	28	71,055	...	....
Erie, Pa.	89	162,740	...	....	96	156,959	...	....
Harrisburg, Pa.	19	7,150	...	....	25	146,160	..	....
Hartford, Conn.	11	17,965	6	3,400	616	174,069	22	36,296
Hoboken, N. J.	3	7,990	15	11,050	3	16,700	16	8,379
Holyoke, Mass.	8	4,460	...	....	13	35,375	...	....
Jersey City, N. J.	59	256,176	...	....	75	276,510	...	....
Lawrence Mass.	9	6,575	...	....	19	32,825	...	....
Manchester, N. H.	7	1,100	38	7,373	31	28,630	5	9,800
Camden, N. J.	33	2,613,445	...	....	58	206,175	45	99,139
Newark, N. J.	136	248,517	...	....	225	1,084,708	...	....
New Bedford Mass.	22	37,800	...	....	35	80,475	...	....
New Haven, Conn.	27	18,810	46	60,597	62	110,406	27	46,900
New York:								
Manhattan	10	78,500	176	378,850	18	858,500	260	724,298
Bronx	3	150,000	94	57,495	31	300,500	178	87,286
Brooklyn	186	2,129,150	505	407,066	143	1,083,950	771	326,516
Richmond	47	535,448	36	20,035	86	220,731	43	26,285
Passaic, N. J.	3	7,550	1	1,200	10	16,000	7	5,000
Paterson, N. J.	13	72,905	61	40,259	30	47,857	62	33,769
Philadelphia, Pa.	333	843,520	...	....	748	2,030,475	...	....
Pittsburgh, Pa.	108	317,384	...	....	285	1,740,451	...	....
Portland, Me.	15	27,235	15	26,937	13	24,635	16	23,935
Quincy, Mass.	289	2,801,432	...	....	69	102,531	...	....
Reading Pa.	13	1,775	140	15,625	32	24,125	132	46,000
Rochester, N. Y.	88	190,333	...	....	156	608,959	...	....
Schenectady, N. Y.	34	112,475	25	4,147	49	87,705	41	16,938
Scranton, Pa.	12	10,420	...	....	35	238,770	...	....
Springfield, Mass.	49	65,999	...	....	76	185,900	...	....
Syracuse, N. Y.	23	6,185	37	12,805	112	146,864	52	74,970
Trenton, N. J.	20	18,230	...	....	51	85,484	...	....
Fitchburg, Mass.	10	40,670	4	5,300	15	12,575	6	4,285
Troy, N. Y.	19	4,327	19	4,327	32	15,339	...	....
Utica, N. Y.	11	231,505	10	22,725	22	95,950	10	12,725
Wilkes-Barre, Pa.	49	13,233	...	....	45	41,815	...	....
Worcester, Mass.	40	12,977	43	127,340	75	125,861	67	63,813
York, Pa.	33	7,580	33	7,580	31	38,941	30	3,940
Lowell, Mass.	20	38.865	25	6,925	40	68,885	39	13,409
Lancaster, Pa.	8	3,730	8	3,730	16	8,800	11	13,900
Mount Vernon, N. Y.	8	4,850	5	900	13	32,840	17	15,410
Newport, R. I.	11	176,050	23	5,925	3	8,500	11	3,450
Providence, R. I.	14	7,500	221	80,700	80	154,000	243	182,000
Chelsea, Mass.	10	7,585	...	....	11	69,878	...	....
West Hoboken, N. J.	8	2,785	...	....	10	18,035	...	....
Yonkers, N. Y.	7	5,600	...	....	32	186,600	...	....
	2511	$12,149,127	2155	$1,638,242	4118	$13,243,489	2788	$2,343,981

CITIES IN SOUTHERN STATES

	October 1918				October 1917			
	New Work		Repairs		New Work		Repairs	
	Permits	Value	Permits	Value	Permits	Value	Permits	Value
Atlanta, Ga.	69	$54,846	92	$35,253	73	$196,314	118	$42,292
Baltimore, Md.	51	215,307	...	....	162	729,281	...	....
Beaumont, Tex.	33	41,141	29	7,290	54	98,277	42	7,650
Birmingham, Ala.	298	89,246	...	....	479	148,677	...	....
Chattanooga, Tenn.	115	14,932	...	....	157	108,721	...	....
Dallas, Tex.	2	3,100	19	11,400	16	40,810	24	27,810
El Paso, Tex.	74	16,369	50	1,372	124	91,000	74	1,372
Jacksonville, Fla.	12	62,800	23	52,475	24	92,372	32	18,470
Houston, Tex.	27	27,180	109	13,233	70	143,017	158	19,084
Huntington, W. Va.	18	64,030	...	....	48	85,480	...	....
Louisville, Ky.	67	88,068	18	8,590	66	65,270	33	19,400
Memphis, Tenn.	45	75,365	45	75,365	210	163,585	74	121,435
Miami, Fla.	19	14,450	...	....	84	106,485	...	....
Montgomery, Ala.	11	1.619	123	15,144	18	14,116	175	14,757
Nashville, Tenn.	316	31,712	...	....	412	199,031	...	....
New Orleans, La.	19	21,100	21	64,145	24	82,986	6	15,341
Norfolk, Va.	22	46,350	2	1,850	33	158,510	13	13,515
Oklahoma City, Okla.	18	11,250	8	4,500	100	287,000	19	38,900
Richmond, Va.	10	8,535	46	36,823	34	56,585	86	43,009
San Antonio, Tex.	227	349,938	...	....	224	239,035	...	....
Savannah, Ga.	18	12,535	7	6,100	13	3,495	5	2,750
Shreveport, La.	...	....	44	10,020	14	105,565	45	15,758
Augusta, Ga.	3	5,050	89	31,567	5	15,435	178	17,380
Tampa, Fla.	2	1,025	31	5,300	21	40,915	89	19,749
Washington, D. C.	66	124,120	220	141,175	86	512,065	243	297,695
Wilmington, Del.	37	504,305	35	69,378	88	356,190	...	....
Corpus Christi, Tex.	11	5,215	...	....	9	6,400	...	....
Fort Worth, Tex.	7	6,195	22	16,408	16	93,795	23	14,935
Knoxville, Tenn.	80	30,612	80	30,612	135	92,792	123	17,843
Pensacola, Fla.	7	4,000	75	8,858	4	1,850	309	14,302
Wheeling, W. Va.	34	7,378	34	7,378	36	14,530	36	14,530
Galveston, Tex.	373	21,071	...	....	261	5,777	...	....
Lexington, Ky.	38	6,025	...	....	17	9,920	...	....
Portsmouth, Va.	15	29,610	...	....	16	34,522.	..	....
Roanoke, Va.	18	4,887	...	....	27	5,100	...	....
	2157	$1,999,366	1220	$654,236	3262	$4,404,403	1905	$797,447

CITIES IN EXTREME WESTERN STATES

	October 1918				October 1917			
	New Work		Repairs		New Work		Repairs	
	Permits	Value	Permits	Value	Permits	Value	Permits	Value
Berkeley, Cal.	8	$173,128	44	$9,210	14	$63,000	71	$28,000
Colorado Springs., Col.	2	1,700	9	3,520	5	31,425	8	4,000
Denver, Col.	2	22,200	127	61,900	68	195,050	115	48,300
Los Angeles, Cal.	51	35,447	292	137,977	309	838,433	278	149,709
Oakland, Cal.	227	357,432	97	24,891	177	367,586	133	59,384
Pasadena, Cal.	9	665	65	12,565	40	71,231	82	31,288
Portland, Ore.	324	275,828	348	104,830	150	178,485	177	89,135
Pueblo, Col.	42	13,450	...	....	50	252,440	...	....
Salt Lake City, Utah	45	151,675	...	....	54	119,380	...	....
San Diego, Cal.	12	38,270	90	28,148	34	22,955	76	15,075
San Francisco, Cal.	21	236,675	196	73,630	85	789,164	330	111,345
San Jose, Cal.	13	13,855	...	....	47	29,509	...	....
Seattle, Wash.	1321	1,273,390	...	....	787	509,405	...	....
Spokane, Wash.	48	2,080	51	13,475	56	48,455	51	17,740
Stockton, Cal.	44	12,981	...	....	58	50,401	...	....
Tacoma, Wash.	335	249,313	...	....	113	88,815	...	....
Fresno, Cal.	24	15.645	51	11,910	68	74,875	64	15,450
Long Beach, Cal.	84	16,214	...	....	102	53,508	...	....
	2612	$2,889,848	1370	$482,056	2217	$3,784,117	1385	$570,226

CITIES IN MIDDLE STATES

	October 1918				October 1917			
	New Work		Repairs		New Work		Repairs	
	Permits	Value	Permits	Value	Permits	Value	Permits	Value
Akron, Ohio	53	$60,140	46	$98,070	291	$628,270	67	$44,985
Canton, Ohio	60	91,380	...	....	63	129,075	...	....
Cedar Rapids, Iowa	18	18,000	...	....	38	218,000	10	23,000
Chicago, Ill	119	1,312,200	...	....	344	2,756,700	...	....
Cincinnati, Ohio	804	331,775	...	....	975	572,695	...	....
Cleveland, Ohio	31	644,200	517	186,880	247	805,400	723	286,230
Columbus, Ohio	71	160,175	81	56,680	131	257,135	66	30,700
Davenport, Iowa	56	16,925	...	....	61	77,743	...	....
Dayton, Ohio	82	267,716	9	3,263	70	110,310	...	....
Des Moines, Iowa	38	127,600	...	....	49	204,199	...	....
Detroit, Mich	234	1,042,010	265	388,970	675	4,018,305	286	292,180
Duluth, Minn	38	20,895	50	61,020	57	92,695	62	151,134
East St. Louis, Mo	18	16,535	...	....	46	234,550	...	....
Grand Rapids, Mich	69	28,374	...	....	145	109,570	...	....
Indianapolis, Ind	51	98,545	344	93,357	152	350,612	297	128,914
Joplin, Mo	6	6,735	7	2,420	30	39,165	10	2,140
Kansas City, Kan	20	117,761	...	....	32	85,863	...	....
Kansas City, Mo	193	299,875	...	....	250	547,050	...	....
Lincoln, Neb	18	5,925	...	....	25	429,930	...	....
Milwaukee, Wis	26	24,085	79	24,693	191	682,522	92	99,800
Bay City, Mich	13	36,600	7	1,955	26	9,450	...	....
Minneapolis, Minn	206	99,095	...	....	437	917,435	...	....
Omaha, Neb	89	600,037	...	....	89	610,890	...	....
Peoria, Ill	22	223,325	...	....	30	31,970	...	....
Richmond, Ind	5	58,840	15	3,200	2	1,100	7	2,775
Saginaw, Mich	77	38,768	...	....	27	26,495	...	....
St. Louis, Ill	114	163,803	290	142,242	287	360,665	369	196,405
St. Paul, Minn	122	100,747	...	....	214	431,050	...	....
Sioux City, Iowa	8	25,900	...	....	55	202,750	...	....
South Bend, Ind	81	23,126	...	....	160	94,176	...	....
Springfield, Ill	3	600	17	5,640	25	68,440	34	26,655
Superior, Wis	54	10,174	...	....	88	35,294	...	....
Terre Haute, Ind	26	17,860	33	8,980	16	14,120	18	23,380
Toledo Ohio	98	82,025	...	....	193	465,264	...	....
Topeka, Kan	8	7,405	6	2,775	12	4,350	5	6,550
Wichita, Kan	35	37,610	...	....	72	662,345	...	....
Youngstown, Ohio	69	136,425	34	19,465	120	326,695	24	37,610
Decatur Ill	14	58,890	3	375	20	210,325	3	725
Eureka Ill	6	23,000	2	2,200	5	2,800	4	2,000
Hamilton, Ohio	5	150,250	15	7,624	5	4,385	6	1,265
Kalamazoo, Mich	1	2,800	3	2,825	11	4,700	3	17,500
Jackson, Mich	32	18,398	...	....	54	22,710	...	....
Joliet, Ill	4	13,500	...	....	8	34,500	...	....
Lansing, Mich	19	7,635	...	....	42	46,530	...	....
Springfield, Mo	22	11,880	...	....	11	15,200	...	....
	3138	$6,639,544	1823	$1,120,624	5888	$16,953,427	2086	$1,373,948

New Catalogs of Interest to the Trade

Reproductions of Concrete and Composition Marbles, Granites, etc.—Art Stone Co., Box 500, Waynesboro, Pa. Illustrates and describes art marble in its varied combinations, uses and its wide application as a building and decorative material.

City Comforts for Farm Homes.—Sewer Pipe Manufacturers' Assn., Akron, Ohio. Booklet tells of installing a sewage system in rural districts. Gives technical information of the advantages of vitrified clay pipe which renders farm sewage possible and practical.

Doorways.—Richards-Wilcox Mfg. Co., Aurora, Ill. The November issue of this interesting house organ describes carrying systems in garages, fruit houses, handling roofing paper, rolls of paper and rolls of steel and for distributing stock. R.-W. grindstones are also illustrated.

Concrete Building Block and Brick.—Portland Cement Assn., Chicago, Ill. Catalog describes and illustrates the fundamental principles in the manufacture of concrete building block and brick. The merit, workmanship, consistency, texture and finish are treated. Standard specifications are given.

The Concrete Builder.—Portland Cement Assn., Chicago, Ill. Tells of the Essentiality of Concrete Farm Building Operations and describes and illustrates corn-cribs, time-saving scaffold for silo builders, concrete dairy barns and other uses of concrete for farm and home.

The Fireproofing Handbook.—General Fireproofing Company, Youngstown, O. The 1918 issue of this annual book is issued to assist the architect, engineer and builder with the most modern approved methods of unburnable building. Shows important details for the various types of construction recommended. Self-sentering, trussit and expanded metal are used as the basis of dealing with the problem of fireproof construction.

Andes Furnaces.—Phillips & Clark Stove Company, Inc., Geneva, N. Y. Catalog gives details of various types and styles of "Andes" hot air furnaces, also pipeless furnaces. Construction and specification figures are also given.

Modern Heating by Means of Pressweld Radiation.—American Pressweld Radiator Corp., Detroit, Mich. Veritable encyclopedia of heating. Explains advantages of the Pressweld radiators as to sanitation, comfort, economy and construction. Photographs and specifications of houses in which they are installed are shown.

Any of these catalogs will be furnished by the manufacturers. Or, if you prefer, we will see that you receive any that you desire. Just check the catalogs you want, tear out the page, and mail it to Building Age, 243 West 39th Street, New York.

Clay Working Machinery.—J. D. Fate Co., Plymouth, Ohio. Describes and illustrates auger machines, pugmills, clay feeders, automatic claycutters, crushers disintergrators and dry pans, elevators and conveyors, winding drums, trucks and barrows, and other clay working machinery. A veritable encyclopedia of clay working machinery.

Herringbone Homes.—Their Character and Construction. General Fireproofing Co., Youngstown, O. Catalog describes and illustrates the construction of a house that is "properly built" with Herringbone metal lath.

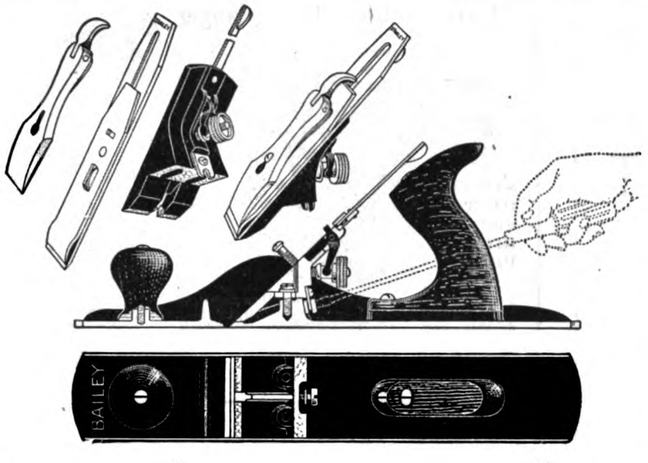
Utilize the Waste Spaces Before You Build Anew.—Beaver Board Companies, 65 Beacon Road, Buffalo, N. Y. Advocates the use of Beaver Board in new construction and repair work. Remodeling of attics with Beaver Board is advised to utilize waste spaces.

Metal Weather Strips.—Diamond Weather Strip Co., Columbus, O. Describes and calls attention to several equipments for weather stripping windows and doors, "The Diamond Way." A few of the thousands of buildings equipped are illustrated in a separate pamphlet. Blue print details showing how to apply them are given, and other interesting information.

Automatic Clay Cutters.—J. D. Fate Co., Plymouth, O. Booklet describes a great variety of automatic cutters which are designed to meet the requirements of the clayworkers who make solid brick, hollow brick, building tile, drain tile and conduits, or, in fact, any clay ware made on an auger machine.

Improved Gas Heating Appliances.—The Sanitary Heating Co., 233 Thirty-seventh St., Brooklyn, N. Y. Gives important reasons for installing a gas heating system in the home. Proposes the "Solar Grand" which will have an artistic appearance that will contribute to the comfort and appearance of the home.

Art Metal Ceilings and Side Walls.—Friedely-Voshardt Co., Chicago, Ill. A most complete and beautifully printed "volume" which is a veritable encyclopedia of artistic steel ceilings, architectural sheet metal ornaments and statues. A most artistic array of ornamental arches, cornices and steel ceilings are shown.



No. 3

No. 5

No. 4

No. 6

Stanley Tools

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In the illustration the detail of construction is very clearly shown. Note that the frog has a support directly at the rear of the mouth, making practically one solid piece from the cap to the bottom. The sides and bottom of the plane are stiffened by means of the cross ribs. The screw bosses on each side of the center rib are very deep, allowing a number of threads to engage, thereby securely holding the frog. The design prevents the plane being drawn out of true when the face of the frog is screwed up hard.

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Briefly, its advantages are: 1. Ease in grinding. 2. Less grinding, as a thin cutter can be kept in condition by honing. 3. Less tendency to "stub off" the cutting edge when honing, hence the original bevel is kept much longer.

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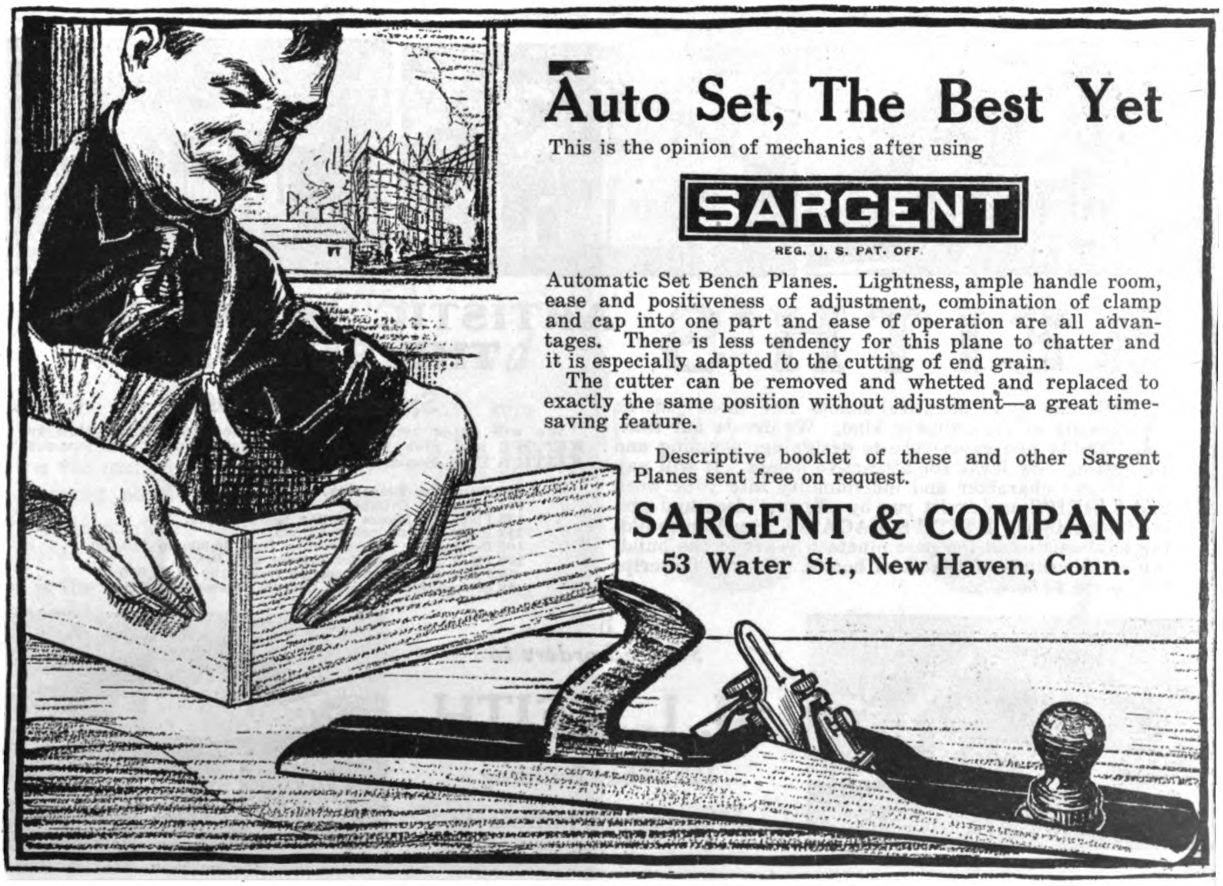

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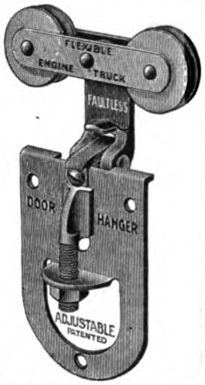

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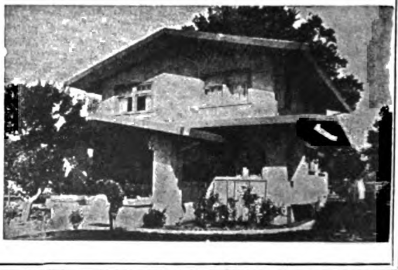

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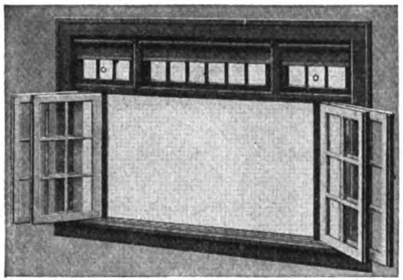

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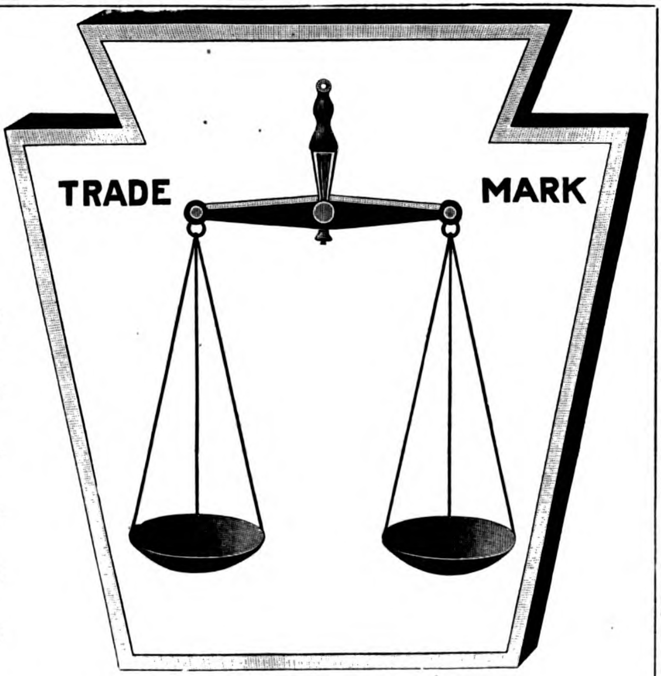

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Something For You

in our Pamphlet 29; viz.:

Valuable Tables for finding size of joist, safe load of joist, actual load on hanger, etc., etc.

Some of these Tables are not in print elsewhere.

The Pamphlet and the Mounted Model Hanger will be mailed on request.

SOMETHING FOR US. We ask your special attention to items 5, 6, 7 on page 5 of the Pamphlet and to the matter on pages 23 and 24 relating thereto.

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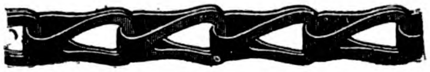
Capacity of chain plant **35 miles per day. Many imitators, no equal.** Used by the **United States Government** for over **30 Years.**



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For Suspending Heavy Doors Gates, Etc.

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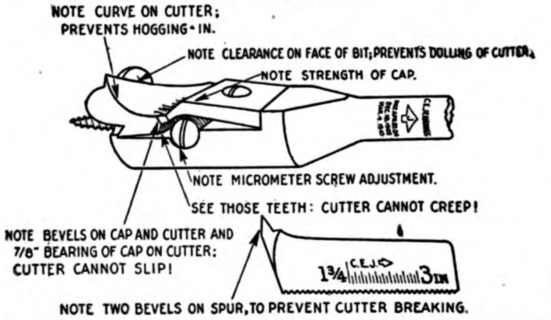

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This butt, besides being absolutely reliable and satisfactory in service, is so attractive that it *adds to the beauty of the door on which it is placed.* It is truly representative of the entire Stanley line.

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Building Age

December, 1918

Formerly Carpentry and Building
Founded 1879

Vol. XL, No. 12

Published Monthly by

THE ARCHITECTURAL AND BUILDING PRESS, INC.

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Contents

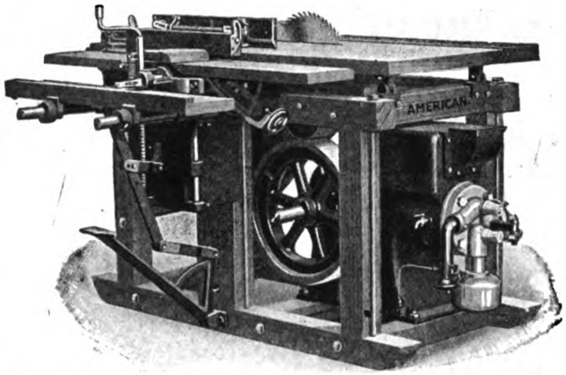
Legal Department:

Construction Questions Answered:

Department of Masonry Construction:

The Editor's Page:

TWO DRAFT-PROOF "AMERICANS" AT YOUR SERVICE



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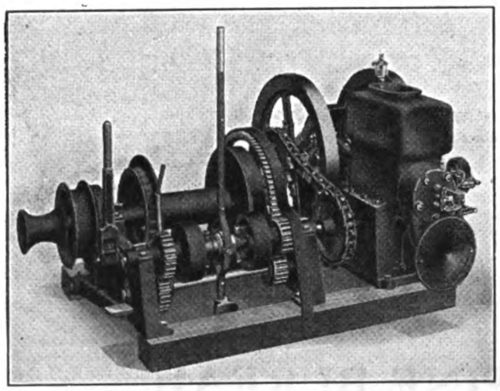

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Four sizes—for the largest areas or the smallest rooms. Built to last.

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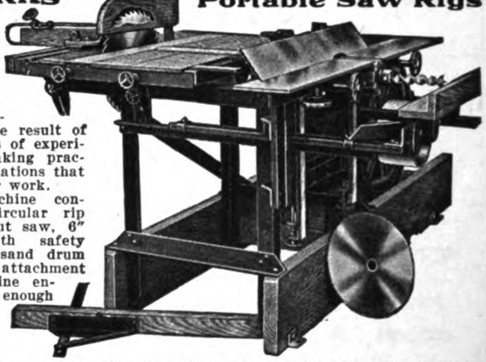

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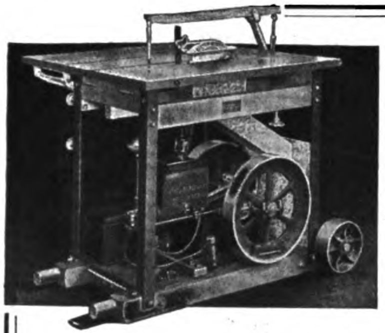

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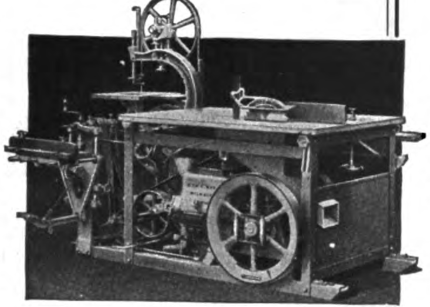

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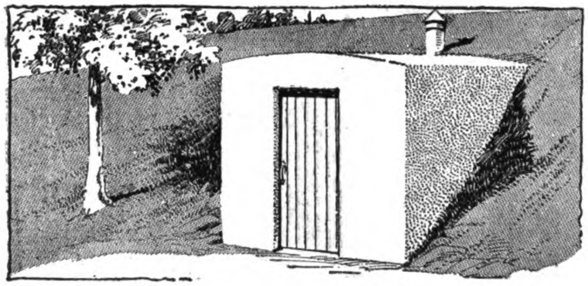

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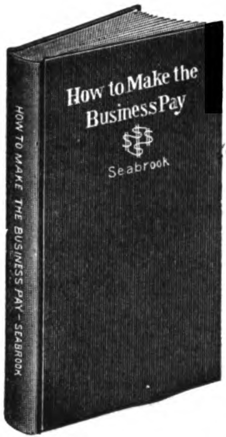

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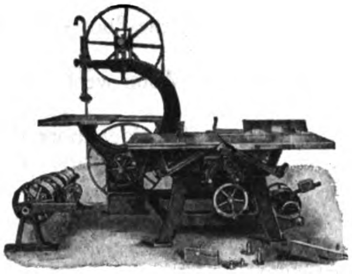

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We are now prepared to take care of all orders.

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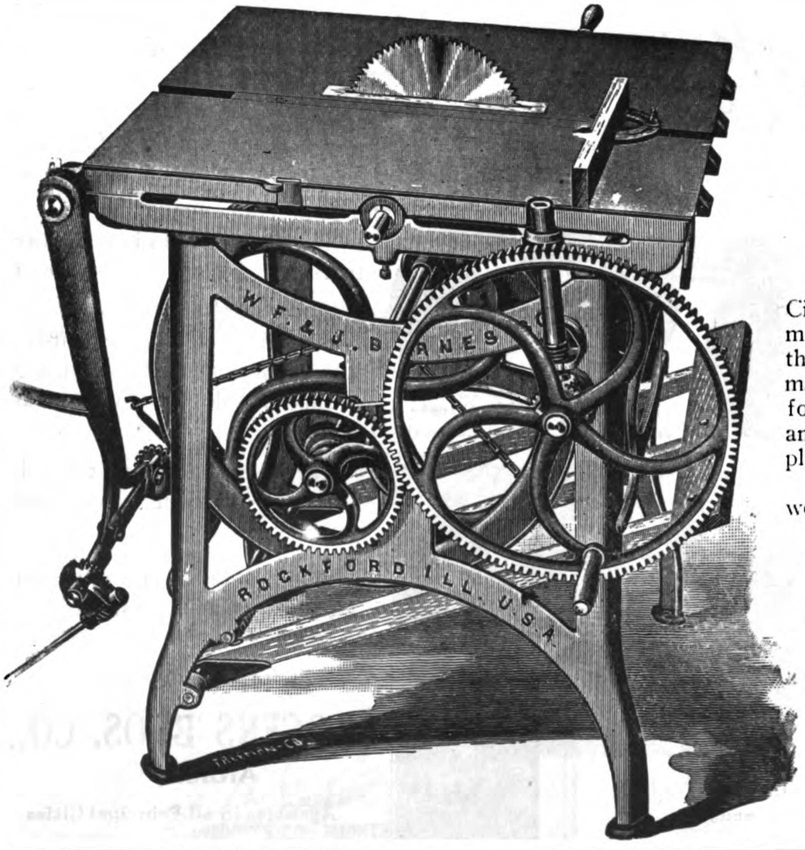

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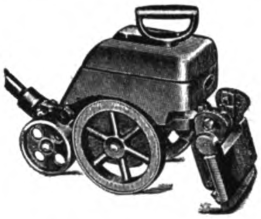

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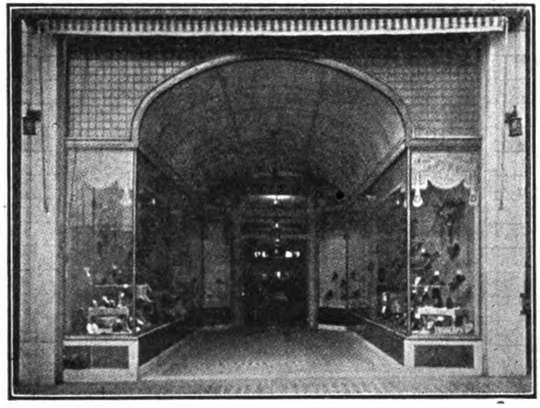

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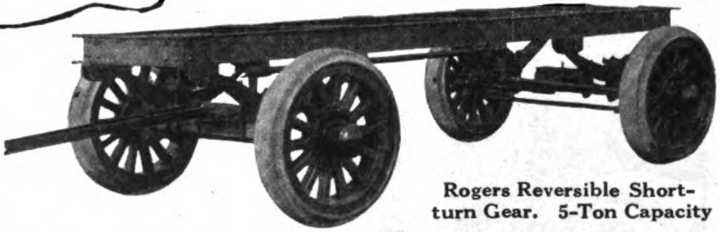

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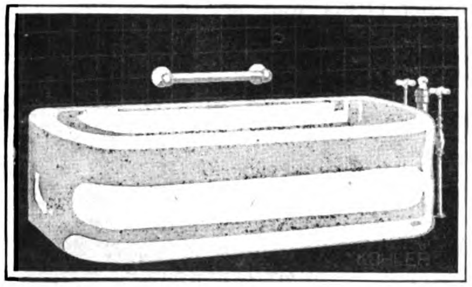
METAL
STORE FRONTS



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Specify and use Herringbone Rigid Metal Lath because it is standard, *full-weight* lath, and because of its exceptional strength and rigidity due to the heavy longitudinal strands, set at an angle of 45 degrees to the plane of the lath.

Our well-organized system of branch offices in all principal centers assures prompt shipment of Herringbone Lath for essential uses in connection with war industries. Having set the highest standards of swift, economical and permanent building materials for many years, we are now fully equipped to give valuable service in the vital problem of housing industrial workmen right.

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New buildings rise from the gutted hole topped with Asbestos Roofing. And for a radius of a mile or two—within the scare circle—homes and factories put on asbestos roofs.

So, the lesson of a fire—the scare circle—sells more Johns-Manville Asbestos Roofing than any other agency or factor.

To the roofer in the community it is a strong object lesson of how people, once awakened to a threatened danger, take steps to guard against it.

In almost every city and town there are essential factories and buildings where loss by fire would result in serious handicap to civic programs. Some of these plants are having additions built; perhaps close by workmen's houses are being erected.

Probably a dozen or more roofers will be after each of these jobs. It is some roofer's opportunity to make himself stand out "head and shoulders" above the others by talking roofing that not only keeps water out but also resists fire and gives maximum long-time service.

This roofer can prove that a roofing made from coal tar or asphalt compound is far inferior to one made of mineral asbestos with just enough Trinidad Lake and other natural asphalts to act as a binder. He can demonstrate that while "rubber type" roofings may look like and smell like Johns-Manville Asbestos Roofing, they do not and will not give the same protection and service.

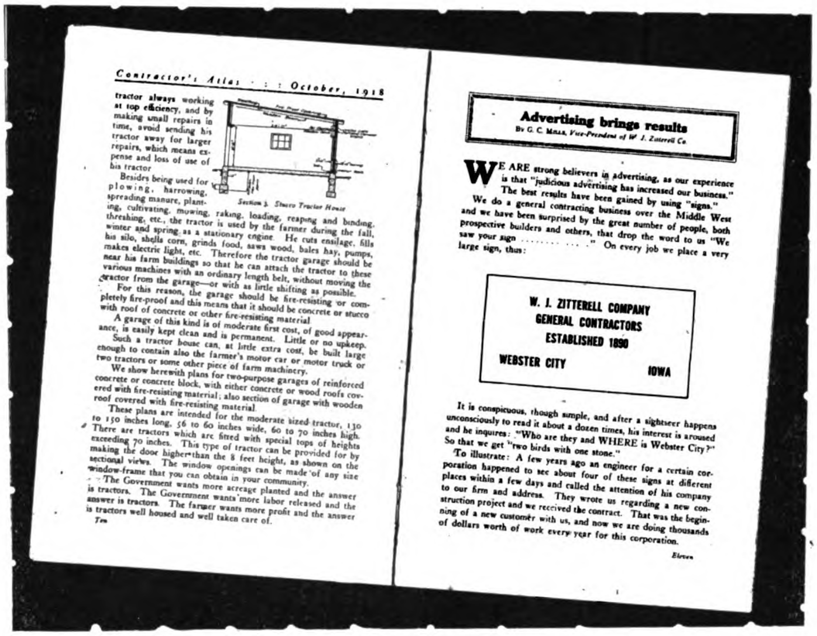
It is a real business-getting opportunity and wise building for the future, because the satisfaction given and reputation made by each Johns-Manville Asbestos Roof reacts to the credit and prestige of the roofer who sold it.

Let us send you full information about Johns-Manville Roofing and the Company behind it—now!

H. W. JOHNS-MANVILLE CO.
New York City
10 Factories—Branches in 63 Large Cities

JOHNS-MANVILLE SERVICE
COVERS THE CONTINENT

JOHNS-MANVILLE
ASBESTOS ROOFING



Contractor's Atlas : : : October, 1918

tractor always working at top efficiency, and by making small repairs in time, avoid sending his tractor away for larger repairs, which means expense and loss of use of his tractor

Section 3. Stucco Tractor House

Besides being used for plowing, harrowing, spreading manure, planting, cultivating, mowing, raking, loading, reaping and binding, threshing, etc., the tractor is used by the farmer during the fall, winter and spring as a stationary engine. He cuts ensilage, fills his silo, shells corn, grinds food, saws wood, bales hay, pumps, makes electric light, etc. Therefore the tractor garage should be near his farm buildings so that he can attach the tractor to these various machines with an ordinary length belt, without moving the tractor from the garage—or with as little shifting as possible.

For this reason, the garage should be fire-resisting or completely fire-proof and this means that it should be concrete or stucco with roof of concrete or other fire-resisting material.

A garage of this kind is of moderate first cost, of good appearance, is easily kept clean and is permanent. Little or no upkeep.

Such a tractor house can, at little extra cost, be built large enough to contain also the farmer's motor car or motor truck or two tractors or some other piece of farm machinery.

We show herewith plans for two-purpose garages of reinforced concrete or concrete block, with either concrete or wood roofs covered with fire-resisting material; also section of garage with wooden roof covered with fire-resisting material.

These plans are intended for the moderate sized tractor, 130 to 150 inches long, 56 to 60 inches wide, 60 to 70 inches high. There are tractors which are fitted with special tops of heights exceeding 70 inches. This type of tractor can be provided for by making the door higher than the 8 feet height, as shown on the sectional views. The window openings can be made of any size window-frame that you can obtain in your community.

The Government wants more acreage planted and the answer is tractors. The Government wants more labor released and the answer is tractors. The farmer wants more profit and the answer is tractors well housed and well taken care of.

Ten

Advertising brings results

By G. C. Mills, Vice-President of W. J. Zitterell Co.

WE ARE strong believers in advertising, as our experience is that "judicious advertising has increased our business." The best results have been gained by using "signs."

We do a general contracting business over the Middle West and we have been surprised by the great number of people, both prospective builders and others, that drop the word to us "We saw your sign . . . ." On every job we place a very large sign, thus:

W. J. ZITTERELL COMPANY
GENERAL CONTRACTORS
ESTABLISHED 1890
WEBSTER CITY IOWA

It is conspicuous, though simple, and after a sightseer happens unconsciously to read it about a dozen times, his interest is aroused and he inquires: "Who are they and WHERE is Webster City?" So that we get "two birds with one stone."

To illustrate: A few years ago an engineer for a certain corporation happened to see about four of these signs at different places within a few days and called the attention of his company to our firm and address. They wrote us regarding a new construction project and we received the contract. That was the beginning of a new customer with us, and now we are doing thousands of dollars worth of work every year for this corporation.

Eleven

Two typical pages of our free monthly, "Contractor's Atlas"

A GOOD contractor overcomes competition by forgetting it and going after business good and hard.

Use Atlas Portland Cement. Get the benefit of the new business opportunities created by Atlas Advertising.

Read Contractor's Atlas. It's full of business-building and money-saving helps, for city or country work. *Send the coupon below today.*

The Atlas Portland Cement Company

Members of the Portland Cement Association

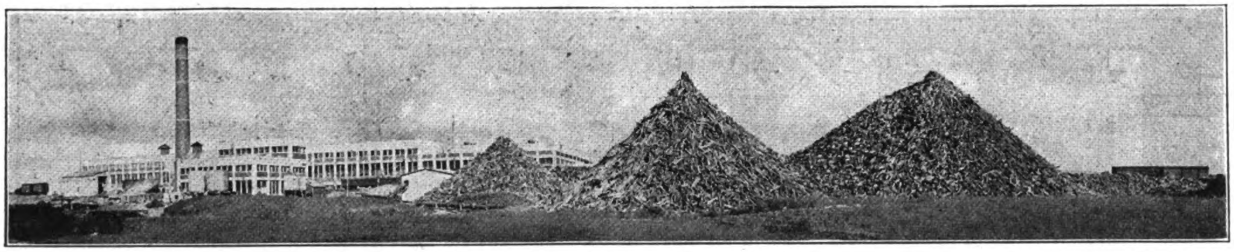
New York Chicago Philadelphia Boston St. Louis
Minneapolis Des Moines Dayton Savannah

ATLAS WHITE

The Atlas Portland Cement Company, 30 Broad Street, New York, or Corn Exchange Bank Building, Chicago.

Please send me, without expense, copy of your monthly, "Contractor's Atlas."

NAME .... ADDRESS ....



The Goodness of Beaver Board Built These Big Plants

What builds a big plant after all? What makes a business successful?

"A really worth-while product which when first introduced sells itself repeatedly."

Isn't this a good answer to the question, and doesn't it cover Beaver Board, the knotless, crackless, manufactured lumber?

We believe so, and we believe that the illustrations shown at the top and bottom of this page prove the value of Beaver Board as a staple building material.

Of course these big plants are significant, but when you consider that there are over 9,000 dealers throughout the world selling this product regularly, you will realize that thousands of carpenter contractors are profiting by its use.

It isn't possible for us to show all the plants of the Beaver Board Companies on this page. In the first place, there are thousands of acres of timber lands with two big mills in the Canadian North where the big spruce trees are felled, cut and shipped by Beaver Workmen. Then there is a large plant located at Ottawa, Canada, and a Varnish Plant for the manufacture of "Sealtite" Sizing at Buffalo. The main plants at Buffalo and Thorold, Ont., are shown here.

BEAVER BOARD
PURE WOOD FIBRE

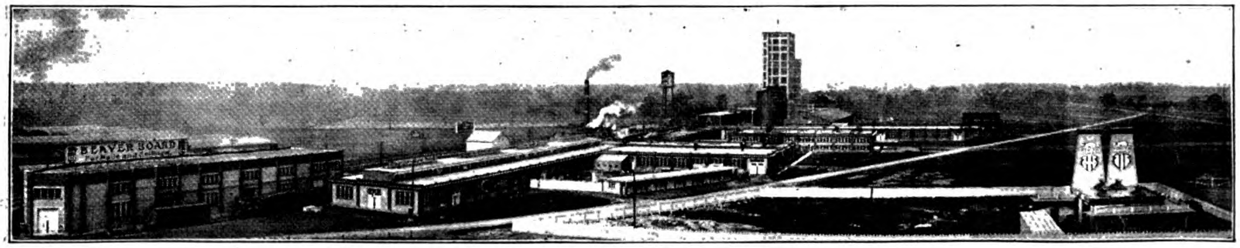
You can't expect Beaver Board results unless this trademark is on the back of the board you buy.

THE BEAVER BOARD COMPANIES
66 Beaver Road **Buffalo, N. Y.**

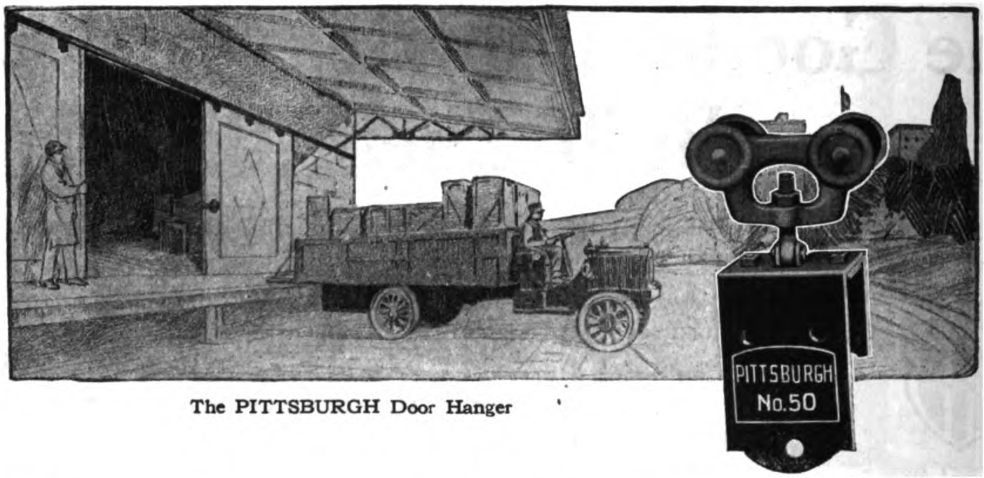
Branches in Boston, New York, Baltimore, Cleveland, Detroit, Chicago, Minneapolis, Kansas City and San Francisco.
Manufacturers also of Beaver Greenboard and Beaver Blackboard.
Distributors in Principal Cities. Dealers everywhere.

BEAVER BOARD

FOR BETTER WALLS & CEILINGS



McKINNEY



The PITTSBURGH Door Hanger

For Industrial Buildings

Properly hung, easy operating doors are of utmost importance in factories and warehouses. Idle moments due to broken down doors means a direct loss to the business just as much as a breakdown in the machinery.

The contractor who devotes a little time and study to the selection of good dependable door hangers and track is amply rewarded in the good-will he creates among the business concerns of his community. This tendency to exercise more thought and study in the solution of the door hanging problem of industrial buildings has resulted in an ever-increasing demand for the PITTSBURGH Door Hanger—because it's dependable.

The several points of superiority and the distinctive features of this hanger are brought out in a little folder we have prepared, which is yours for the asking.

McKinney Manufacturing Company

Pittsburgh, Penna.

For 50 years makers of wrought steel builders' hardware

HARDWARE

The
H. B. Ives Co.
New Haven, Conn.,
U. S. A.

ESTABLISHED 1876
INCORPORATED 1900

Manufacturers

BUILDERS' HARDWARE
HIGH GRADE WINDOW AND DOOR SPECIALTIES

WRITE FOR ILLUSTRATED FOLDER

SAMSON SPOT SASH CORD

SAMSON CORDAGE WORKS, BOSTON, MASS.

For the outer covering of a building, no other wood gives such long and satisfactory service as

WHITE PINE

Prentice Sanger, Architect, New York.

A Cabot-product House

This handsome and homelike country residence has its roof shingles stained with

Cabot's Creosote Shingle Stains

for the rich, velvety coloring and preservation of the wood; its wall shingles and trimmings finished with

Cabot's Old Virginia White

to give the soft, brilliant "whitewash effect" that is so beautiful, and its walls lined with

Cabot's Sheathing Quilt

to make the house warmer in winter and cooler in summer. The Cabot specialty is the production of unique, artistic and thoroughly reliable house-building materials, and over thirty years' experience has earned them the approval of the leading architects all over the country. You run no risks in using Cabot products.

You can get Cabot's goods all over the country.
Send for samples and name of nearest agent.

SAMUEL CABOT, Inc., Mfg. Chemists
BOSTON, MASS.
1133 Broadway, N. Y. 24 W. Kinzie St., Chicago

Cabot's Conservo Wood Preservative, Stucco Stains, Brick Stains, Damp-Proofing.

In-Lade

Design Roofing

For Beauty and Permanence

Send for samples to show your customers. IN-LADE design roofing will help build up your roofing business. Others are handling it with big success—why not you?

It may be laid over wood shingles, adding warmth, beauty and distinction to any home. No trouble, no painting, just unroll and apply. Made in rolls of red, moss, green, and white. Approved by the National Board of Underwriters "Class C."

AMALGAMATED ROOFING CO.
431 S. Dearborn Street Chicago, Ill.

Eastern Office
Fulton Bldg.
Pittsburgh, Pa.

Southern Office
18 So. 20th St.
Birmingham, Ala.

Section of Outside Wall of House, Showing Wool Between Studding.

Mineral Wool for Building

Mineral Wool has superseded all other materials used for similar building purposes because it does "a great work at little expense." A house lined with Mineral Wool has an indestructible, fireproof and vermin-proof guard; it protects the entire household. In the winter time it keeps the cold air out, facilitating proper heating and economy in fuel. In the summer it keeps the heat out.

This material, being of fibrous, inelastic composition, acts as a deadener and muffles all sound. It is considered the best insulator material on the market, making it a perfect refrigerating machine.

Mineral Wool makes life-long friends of all its users. If you are skeptical as to its power, let us demonstrate. We can prove all claims. Write us to-day.

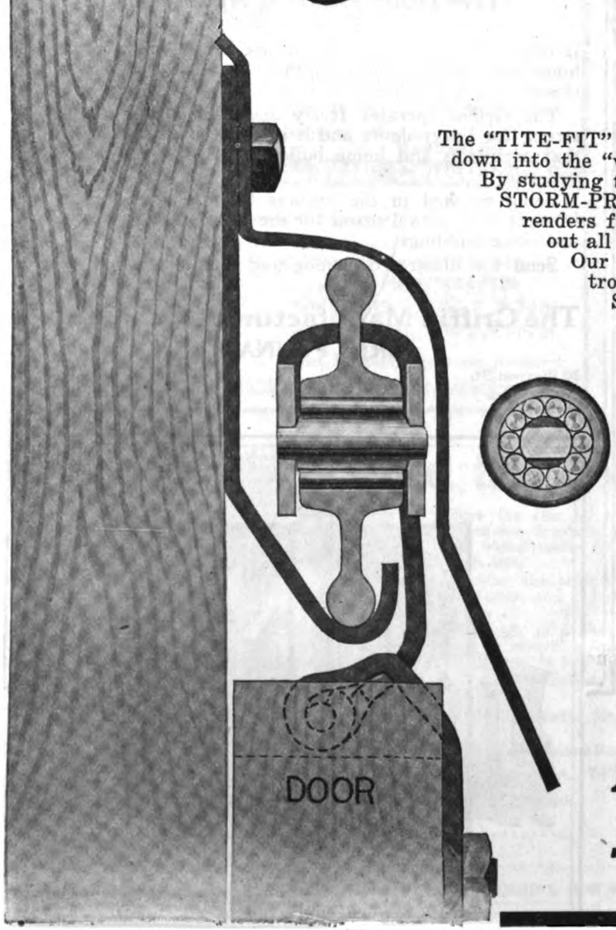
U. S. Mineral Wool Co.
280 Madison Ave., New York
(Cor. 40th St.)

Section of Sound-Proof and Fire-Proof Partition. Can be used for outside walls also.

Point Out the "TITE-FIT" feature

of the Storm-Proof Rail

It means protection for the top of the Barn Door

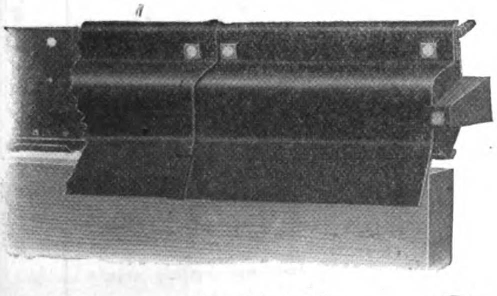


The "TITE-FIT" is a means of protection, preventing water from running down into the "works."

By studying the lower illustration you will note that the IMPROVED STORM-PROOF RAIL has an extra long overhanging cover which renders full protection to the opening above the door-top, keeping out all moisture.

Our STORM-PROOF RAIL puts an end to all door hanger troubles for all time. It fits closely against the building. Storm-proof and bird-proof. No brackets are required, as the rail itself forms a continuous bracket. Exceedingly strong and will support all the weight the hangers will carry.

Write for catalogue showing our full line of door hangers and rails.

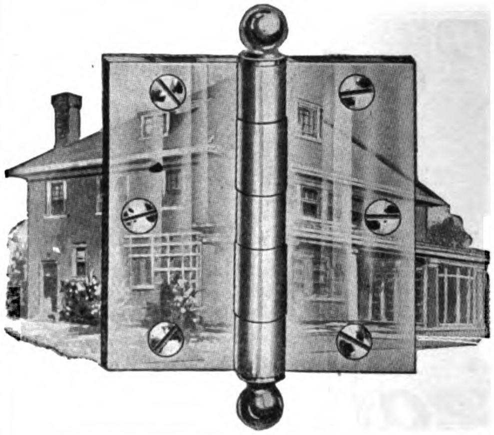


National Mfg. Co.

Sterling, Illinois.

A Christmas that is deeply joyful and a New Year full to overflowing with Prosperity, we sincerely wish to all our friends the world around.

The L.S.Starrett Co.
Athol, Mass.



Your
ATTENTION!!

is called to the hinges on the door. To some people door hinges may seem rather small and unimportant—nevertheless, their mission in helping to make or mar the appearance of the rooms in a modern home is worthy of serious thought. The

GRIFFIN
"The Door Butt of America"

is designed along lines that insure both *beauty* to the home and *service* whenever the doors are opened and closed.

The Griffin operates freely and easily, it is amply strong for heavy doors and it is such a pleasing fixture that architects and home builders are glad to specify and use it.

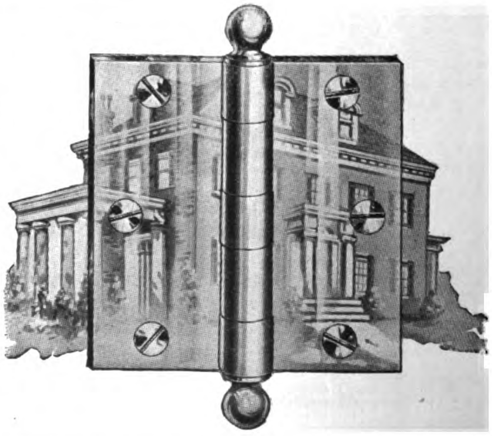
Being finished in the various Griffin hardware finishes, it is in wide demand for the better class of houses and office buildings.

Send for illustrated catalog and circulars.

The Griffin Manufacturing Company
ERIE, PENNA.

30 Warren St.
New York

17 E. Lake St.
Chicago

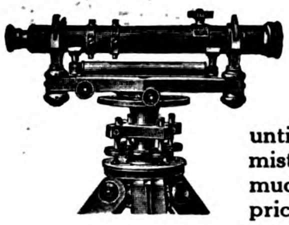


No. 2020

Let a "White" Control Your Lines and Levels

Hundreds of contractors are letting a "White" convertible control lines and levels on their jobs. **They know a "White" can be relied on. They know a "White" convertible level is accurate, dependable, durable.** Why not profit by their experience and let a "White" control your lines and levels? **You'll never regret it.** Send for complete description and details of trial offer.

DAVID WHITE CO., (Inc.)
421 East Water Street
MILWAUKEE, WISCONSIN



Don't YOU Wait

until you have made a mistake that will cost much more than the price of a good level.

Get a "Kolesch" *Now*

Send for prices and full particulars

KOLESCH & CO., 138 Fulton St., New York

The Recessed Steel Medicine Cabinet

HESS SANITARY LOCKER

MEDICINE CABINET

The Only Modern, Sanitary STEEL Medicine Cabinet

or locker, finished in snow-white, baked everlasting enamel, inside and out. Beautiful beveled mirror door. Nickel plate brass trimming. Steel or glass shelves.

Cost Less Than Wood

Never warps, shrinks nor swells. Dust and vermin proof, easily cleaned.

Should Be in Every Bath Room

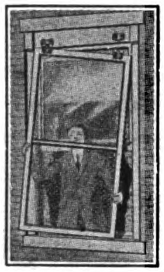
Four styles — four sizes. To recess in wall or to hang outside.

Send for Illustrated Circular

The Outside Steel Cabinet

HESS, 1201-L Tacoma Building, Chicago
Makers of Steel Furnaces. Free Booklet

MAKE Hanging Storm Sash Easy, Quick Work



Done in a jiffy when your storm sash are equipped with KEES (Gossett) Hinges. Put on in no time. No tools or ladder needed. Simple, inexpensive, satisfactory. Millions in use.

KEES (Gossett) Hinges for Storm Sash

Made of either wrought steel japanned, solid brass, solid bronze or galvanized steel—screws to match. Our storm sash fastener makes opening and closing of sash easy. Holds sash open for ventilation. Windows can be raised or lowered to suit. A great combination. Write for FREE Samples for Trial NOW! Address.

F. D. Kees Mfg. Co., Box 812 Beatrice, Neb.

Built Like a Thermos Bottle

Two concrete walls with continuous dead air space between. Warm in winter—cool in summer—dry, sanitary, fireproof and permanent. Built with very flexible and compact metal forms—eliminating the cost of form lumber and speeding up the work. In normal times Van Guilder double wall construction costs no more than good frame construction, and in these times considerably less. Write for complete details.

VAN GUILDER DOUBLE WALL CO.
20 Wagner Bldg. Rochester, N. Y.

Van Guilder Double Wall Construction

CALDWELL SASH BALANCES UNIFORM MORTISES

Patent Pending

They have stood the test of time

For use in all classes of new work

Box frames unnecessary

Mortises cut at mill reduce cost of installing. Counterbalance sashes at any given point. They outwear ordinary weights and cords. Unaffected by atmospheric conditions.

Cheapest method for modernizing old windows, as alterations in sashes and frames are not necessary. Sashes should be weighed before ordering.

Write for Circular

Caldwell Mfg. Company
5 Jones St., Rochester, N. Y.

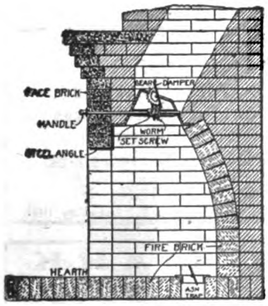
There's beauty and durability and satisfaction for contractor, architect and owner in every brushful of

TRADE MARK NICE REG. U.S.A.

VARNISHES
WOOD FILLERS
PAINTS, STAINS

Prices, Samples, Literature on request.

EUGENE E. NICE, Philadelphia

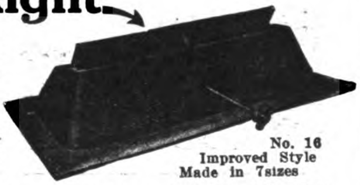


Build the Fireplace Right

Don't try to reduce the cost by leaving out a good damper. It results in an expensive fireplace to operate and allows rain, wind, birds and other objectionable things to enter the room when the fireplace is not in use.

Stover Dampers support the brick work, form a smooth throat, regulate the draft perfectly, and reduce the labor cost of erecting fireplaces.

The price is low enough so a Stover Damper can be used in every fireplace. Made in several styles for all size openings. The improved style shown above is one of the most popular.



No. 16
Improved Style
Made in 7 sizes

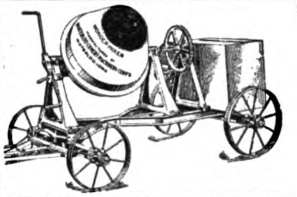
Send for catalog No. 1740 showing our fireplace fixtures and giving information as to the best fireplace construction.

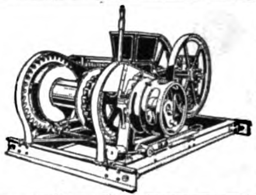
We also make windmills, feed mills, gasoline engines, hinges, pulleys, saw vises, latches, sink brackets and other hardware.

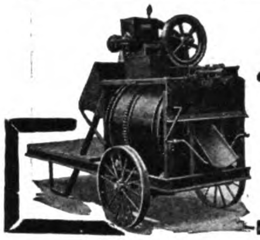
STOVER
Mfg. & Engine Co.
Freeport, Illinois

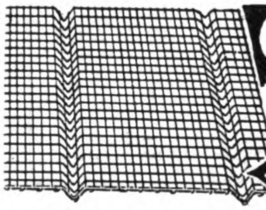
Stover Mfg. & Engine Co., 747 East St., Freeport, Ill.
Send us Catalog 1740.

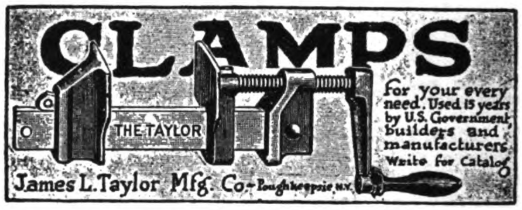
Name .... Business ....
City .... State ....

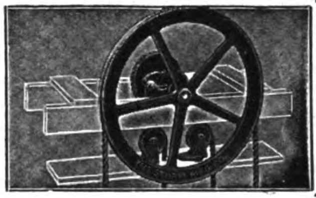


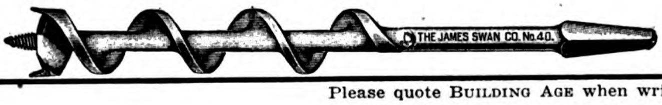


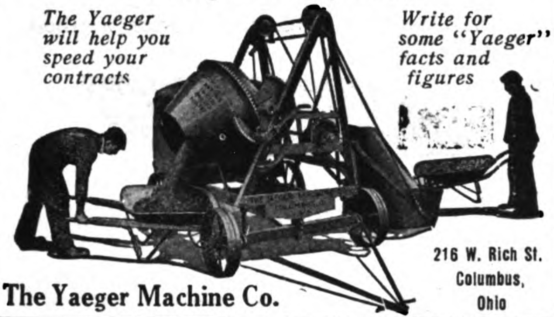


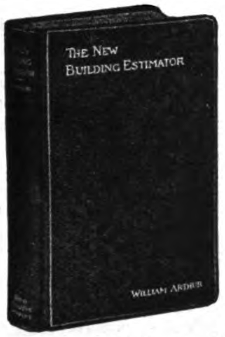


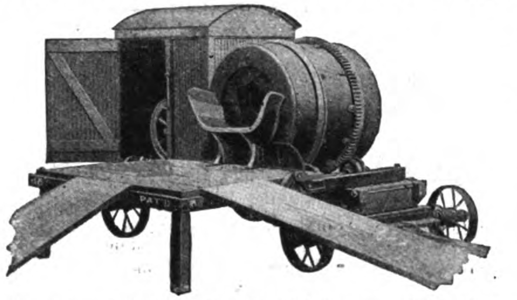


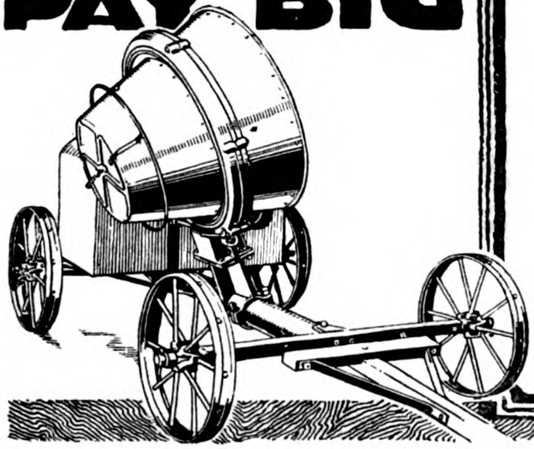



THE JAMES SWAN CO. No.40.




THE NEW
BUILDING ESTIMATOR
WILLIAM ARTHUR





Vendor

VENDOR SERVICE

FORESTALLING ROOFING COMPLAINTS

Unnecessary complaints are stopped before they start, if you use "Vendor" Roofing Slate on that roof. "Vendor" service means that you get exactly what you order, and get it promptly. We make it a special point to ship promptly. More than Forty of the largest producing quarries in the country make "Vendor" service.

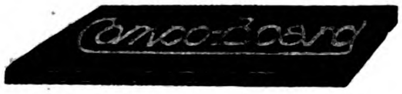
The United States Government knows this. That's why they are using such quantities "Vendor" Roofing Slate.

We still have open territory. Write for our proposition.

VENDOR SLATE CO.
INCORPORATED
BANGOR, PENNSYLVANIA
Largest Shippers of Roofing Slate in the World

Hidden Strength

That smooth outside fibre covers a wood core that puts

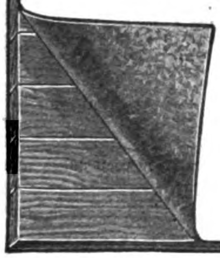


in a class by itself for *strength, rigidity and toughness*. Compo-Board wall won't warp, shrink, chip, crack or mar with the knocks of furniture. They keep out heat, cold and moisture.

It's a "right hand" material for any carpenter.

There are 1001 jobs that can be done with Compo-Board more satisfactorily, quicker, and with less muss, fuss and worry.

Compo-Board is the only wall board with the wood core.



Sold in strips 4 feet wide by 1 to 18 feet long by dealers everywhere.

Send for sample and interesting booklet.

The Compo-Board Co.
5778 Lyndale Avenue N.
Minneapolis, Minnesota

"Go Carefully Into the Comparative Cost of Sheldon's Slates and Artificial Roofings

You will find that you can have an attractive roof of

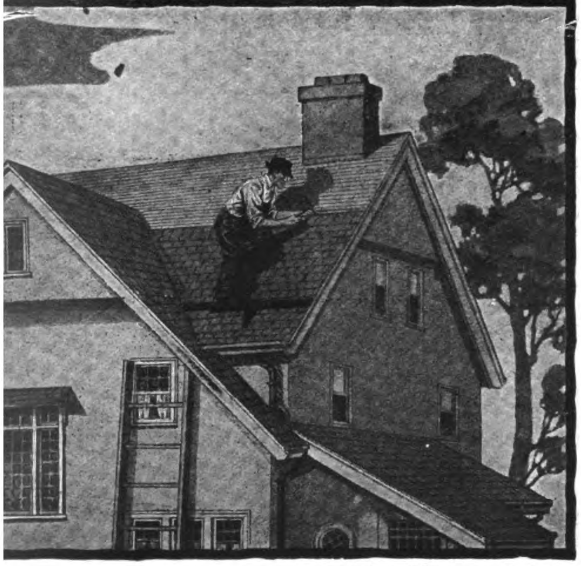
SHELDON'S SLATES

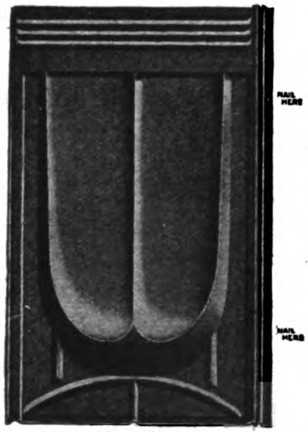
at the cost of a flimsy artificial roof. And the first cost will be the only cost—there will be no renewing, repairing or repainting.

Ask for interesting booklet, "The Roof of Eternal Youth," fully describing Sheldon's Slates.

Roofers: You can make money laying Sheldon's Slates. Write.

F. C. SHELDON SLATE COMPANY, Granville, N. Y.





Edwards

Edwards Metal Shingles Will Outlast Your Building

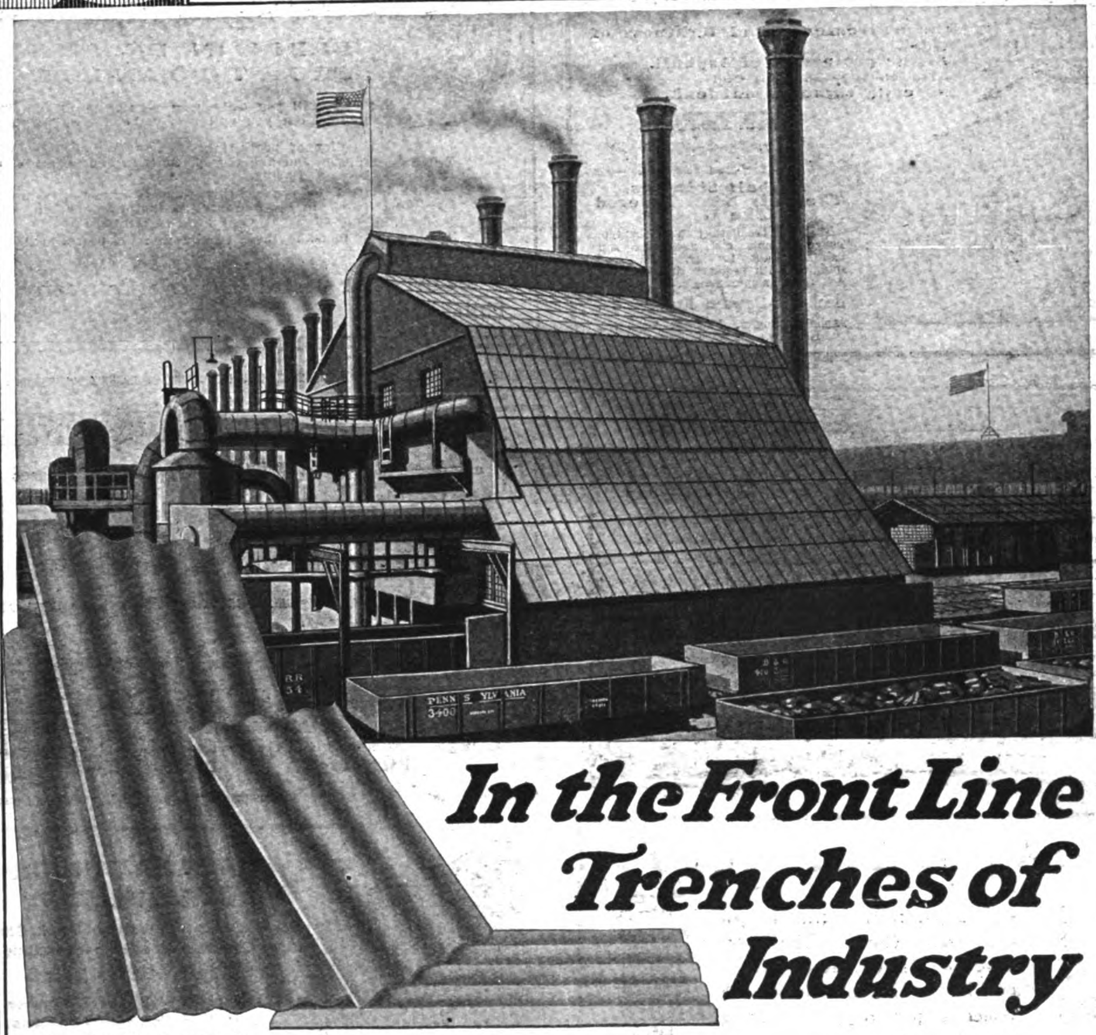
Rot-Proof
Fire-Proof
Lightning-Proof

We want a good, live man to represent us in each locality—to push our surpassing line of Metal Shingles and other up-to-minute metal roofings.

WRITE US TODAY ABOUT YOUR TERRITORY. Our business is growing so rapidly that it is necessary to have an agent in every community. The territory is going fast. One day's delay may mean that some one else will be given your territory. *Don't delay. Write today for our special Agents' Proposition.*

The Edwards Manufacturing Co.
"The Sheet Metal Folks"
423-443 Eggleston Ave. Cincinnati, Ohio

World's Largest Manufacturers of Metal Roofing, Metal Shingles, Metal Spanish Tile, Metal Ceilings, Metal Garages, Portable Buildings, Metal Lockers, Rolling Steel Doors, Partitions, etc.



In the Front Line Trenches of Industry

Cinerating Plant, Jones & Laughlin Steel Co., Hazlewood, Pa., covered with Ambler Asbestos Corrugated Roofing.

Here, as well as in the trenches "over there," there is danger—danger from fire. In all the large industrial centers where men are working day and night there is the constant menace of fire due to increased activity. Thousands of buildings and manufacturing establishments are protected from this menace by

Ambler Asbestos Corrugated Roofing and Siding

But there are many new structures that will be exposed to the danger of fire unless they are so protected. Contractors and builders who protect the buildings they have in their charge by specifying Ambler Asbestos Corrugated Roofing and Siding are doing a patriotic service. Loss by fire now not only means the loss of the building burned but also thousands and often millions of dollars worth of munitions and other supplies that would be saved if the building were properly protected.

Ambler Asbestos Corrugated Roofing cannot burn because it is made of non-burnable materials—Asbestos and Portland cement. It never needs repairs. Never requires paint and is not affected by weather conditions.

THE IDEAL SKYLIGHT

We have manufactured exclusively for us a Corrugated Wire Glass to be used for skylights in conjunction with Ambler Asbestos Corrugated Roofing. It makes a non-leakable, fireproof skylight. Easily put into place and is much more economical than other types of skylights.

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Manufacturers of Ambler Asbestos Shingles, Asbestos Corrugated Roofing and Siding, 85% Magnesia Pipe and Boiler Covering, and Asbestos Building Lumber.

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The convenience and lightness of wood.
All the protection of Asphalt.
Easy to lay—low in cost.
Perfectly tight—do not leak.

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Asphalt Shingles
The Only Kind Tapered Like Wood

Thick at the butt—thin at the top. Tough, pliable and resist fire and weather. Easy to lay, like wood shingles, with ordinary shingle nails. Ask for a sample shingle.

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Our policy of protecting contractors and builders assures you a lower price and a higher profit than can be made from handling other types of roofing.

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BLACK BOARDS
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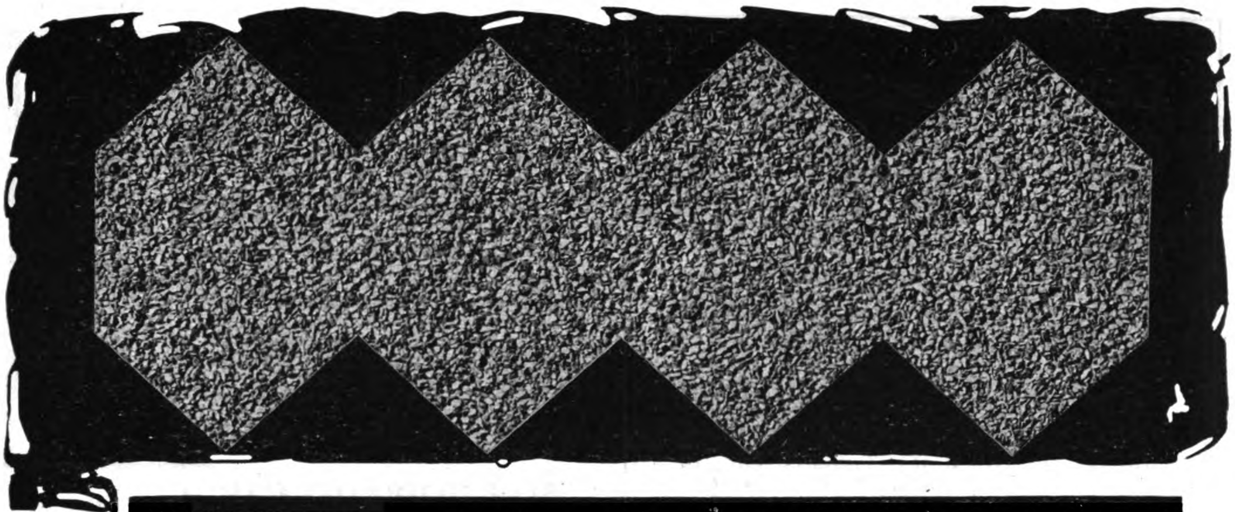

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They are four shingles in one. Laid without chalk lines, and with less nailing, they save 50% in labor—38% in nails. Their weight saving shape reduces shipping costs 25%.

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DIAMOND POINT SLAB ASPHALT SHINGLES

"Four Shingles in One"

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STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF CONGRESS OF AUGUST, 24, 1912

Of BUILDING AGE, published monthly at New York, N. Y., for October 1, 1918.

State of New York, County of New York, ss.:

Before me, a Notary Public in and for the State and county aforesaid, personally appeared Fred S. Sly, who, having been duly sworn according to law, deposes and says that he is the Business Manager of the BUILDING AGE, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management, etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 443, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business manager are:

Publisher, The Architectural & Building Press, Inc., 243 West 39th St., New York City. Editor, Ernst Eberhard, 243 West 39th St., New York City. Managing Editor, Willard C. Howe, 243 West 39th St., New York City. Business Manager, Fred S. Sly, 243 West 39th St., New York City.

2. That the owners are:

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FRED S. SLY,
Business Manager.

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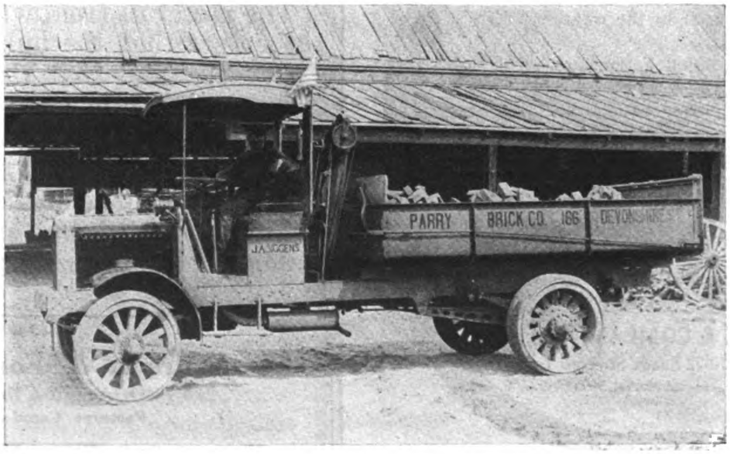

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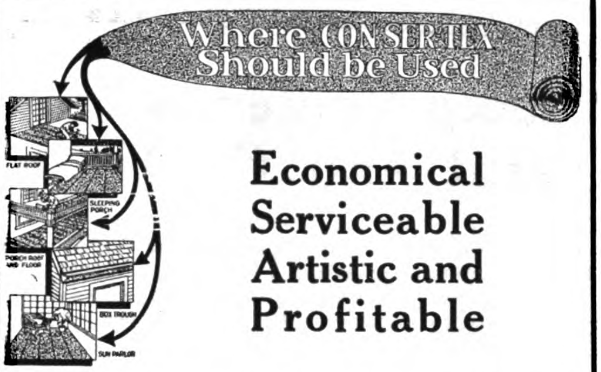

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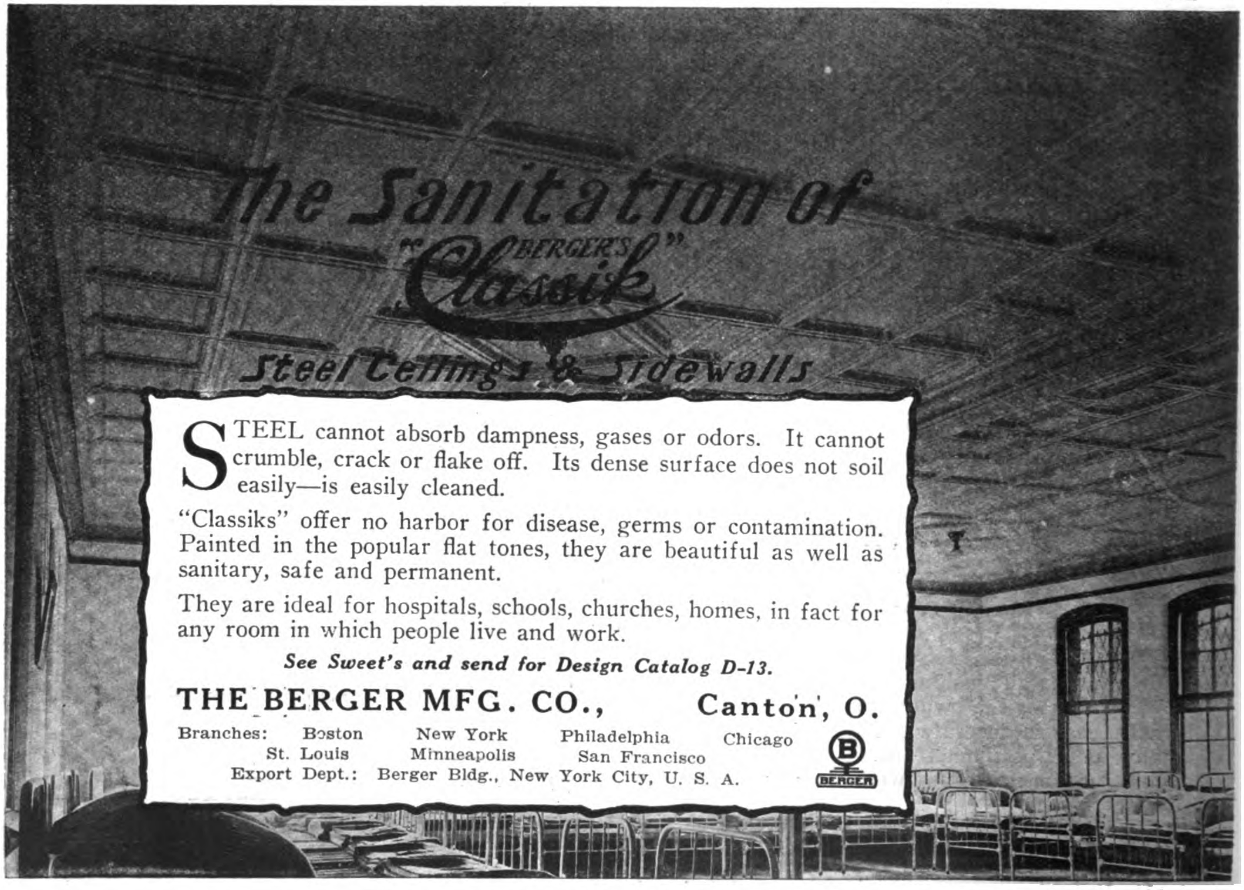

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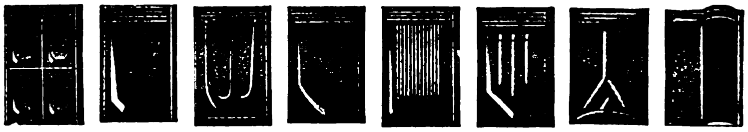

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The Most Complete Line of Designs The Best Material, Workmanship and Finish
Made in Painted Tin or Genuine Re-dipped Galvanized Tin
Sold at the right price May we send you full-size samples and prices?

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What's Behind Your Plaster

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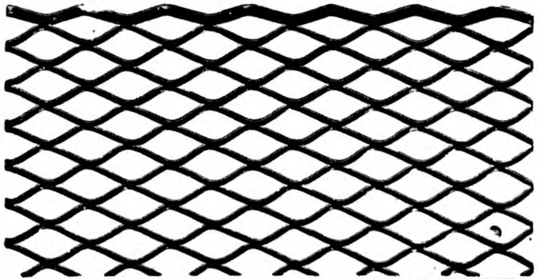
TRADE NETMESH MARK



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Winter Construction—

Don't wait until Spring to remodel your house. Now is the opportune time to get low bids from contractors who aim to keep busy during the Winter season.

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IMPERISHABLE STUCCO

The original magnesite stucco can be successfully applied during freezing weather. It is immune to frost or frigid temperatures—doesn't expand or contract like ordinary stucco—absolutely imperishable.

The artistic possibilities of overcoating with *Kellastone* are unlimited and the work is quickly and economically done over the weather boards.

Kellastone makes old buildings new—adds value and years of service to your property, reducing fuel bills, upkeep and general expense. Learn the truth about *Kellastone*. Send for free booklet.

National Kellastone Company, 1317 Mallers Bldg., Chicago

BERGER

Beautiful Caen Stone

Backed by

Berger's Expanded Metal Lath

The American reproduction in cement of this beautiful product of Old Normandy has been received with great favor by Architects and Builders.

As a backing for it, Berger's Expanded Metal Lath has been widely used.

Any less perfect backing is out of the question, for cracks or stains are particularly noticeable in a product of such fine texture and delicate color.

THE BERGER MFG. CO., Canton, Ohio

Branches: Boston New York Philadelphia Chicago St. Louis Minneapolis San Francisco
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Members Associated Metal Lath Manufacturers

IN THE CLEVELAND MUSEUM OF ART

Caen Stone on Berger's Expanded Metal Lath was used throughout the building.

The Arch illustrated here is at the foot of a stairway in the Cleveland Athletic Club.

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Profit with Neponset

NATIONAL economy doesn't mean less roofing. It means that the method of laying time-tested roofing is changed to meet the conditions caused by war. Neponset came to the front with its war-time method of laying Neponset Paroid Roll Roofing (red or green, slate surfaced) right on top of old wood shingle roofs that leak. It proved a double blessing.

Mr. House Owner likes Neponset Paroid Roll Roofing because it fits his war-drained purse, and it looks mighty attractive. Because he doesn't have to go to the expense of ripping old shingles off, it gives a new fire-safe, weather-tight roof at half the cost of a new wood shingle roof.

Carpenters and builders are making money with Neponset. Each job is a profitable job. Men are kept busy. It's an after-the-war opportunity no carpenter can afford to miss. It's the one way to get in on the present roofing business on the right basis.

BIRD & SON, Inc., Dept. B, East Walpole, Mass.
(*Established 1795*)
Chicago New York Washington
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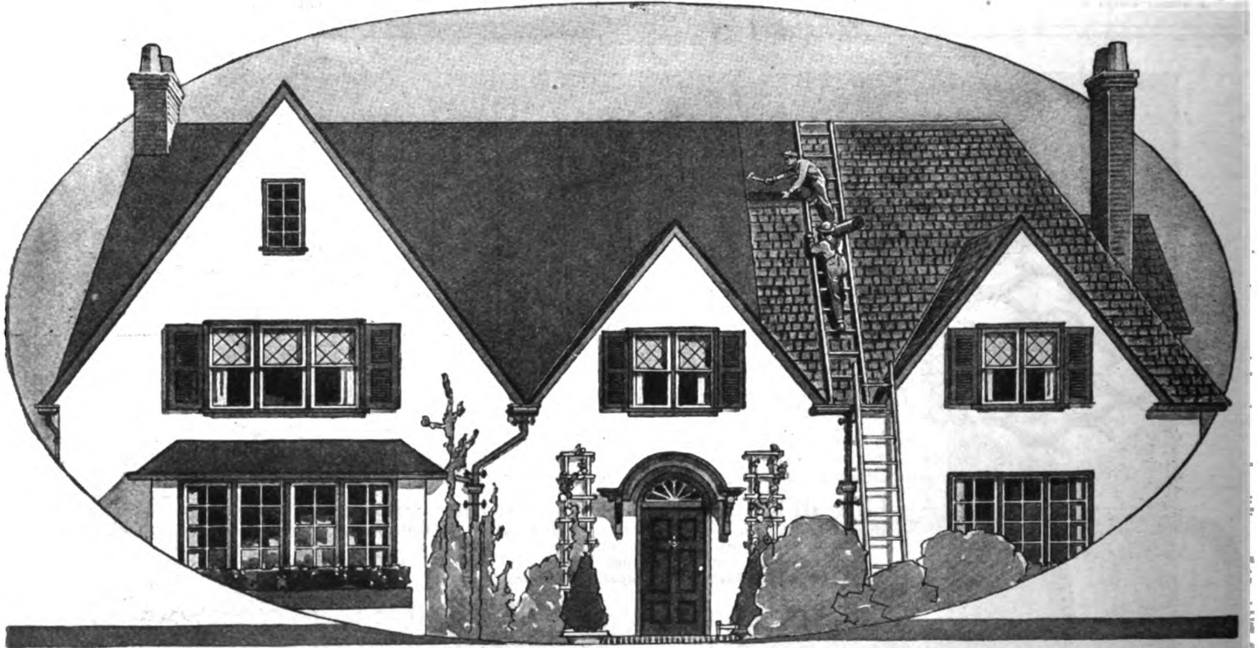

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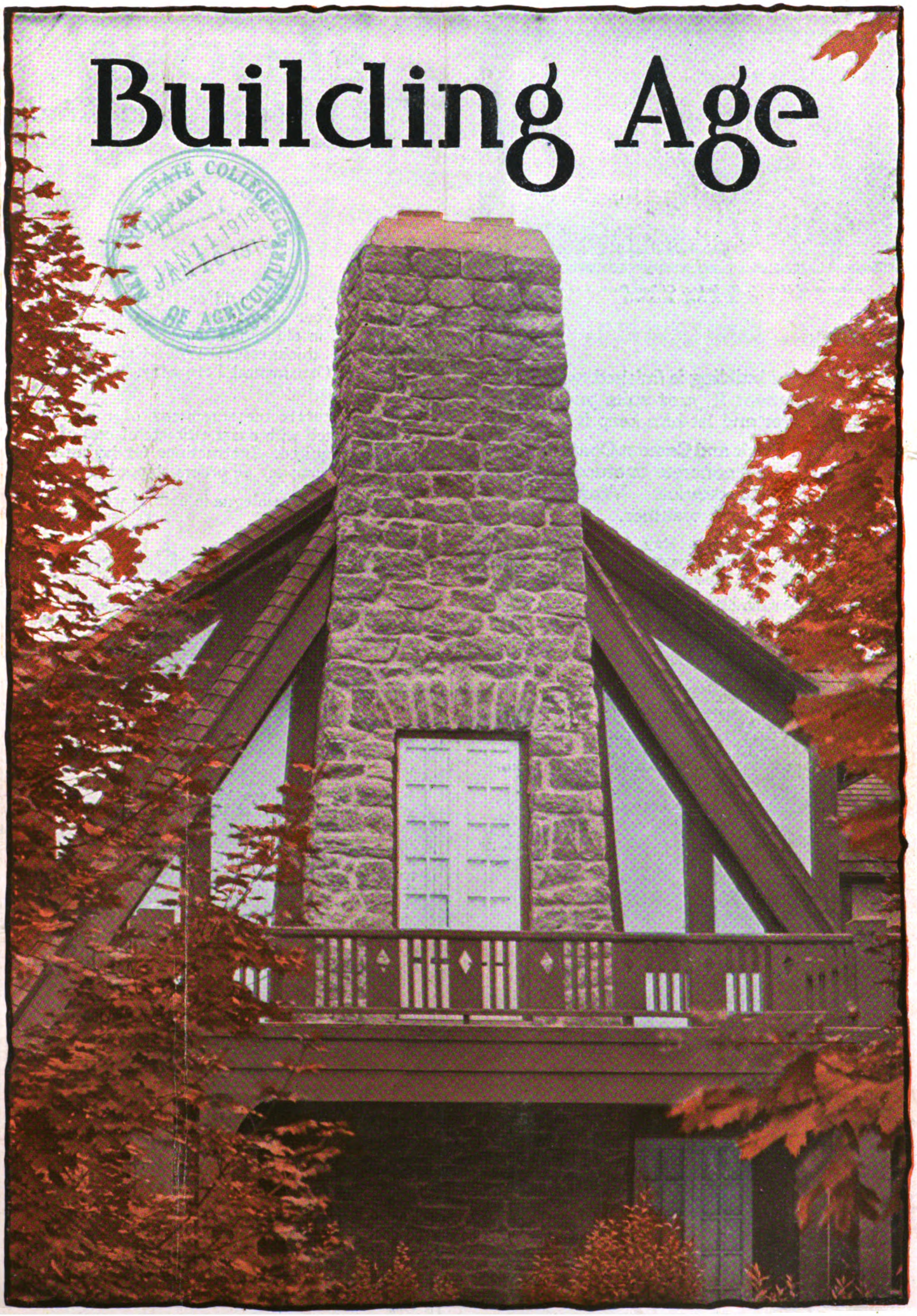

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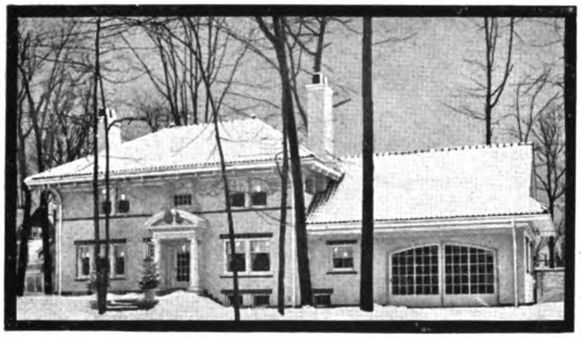

Residence of Mrs. T. R. Baker, Clifton Park, Lakewood, O.
G. B. Bohm, Architect

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When your building is finished, when from roof to basement it *just* suits you—call in the Bay Stater and let him keep it so.

Bay State Brick and Cement Coating covers up walls of brick, concrete or stucco. It seals every crack and crevice. Wards off the effects of wear and weather.

Besides a preservative Bay State Coating is a beautifier. White and a variety of attractive tints offer a selection that meets individual tastes.

Entrust your handiwork to the Bay Stater's care. Write for Booklet No. 19, which tells you a lot about "Bay State" and ask for a sample which will prove all the book says. Do that today.

Bay State Cement Crack Filler makes cracks in cement disappear like magic. It makes a patch that shows no seams. A sample will prove it.

WADSWORTH, HOWLAND & CO., Inc.
Paint and Varnish Makers
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BAY STATE
Brick and Cement Coating

The Bay State

FLOORS
The Wood-Mosaic Kind

For every home—Old or New. Can be installed by your mechanics. Our 5/16" flooring can be laid in old or new houses. We make all kinds and thicknesses; Wood-Carpet, strips Plain and Ornamental Parquetry, Tongue and Groove Flooring.

Send accurate measurements of rooms for colored sketch with exact estimate of cost of the flooring required. Instructions for laying and finishing accompany all orders shipped.

Send for free catalogue in natural wood colors.

Wood-Mosaic Company
New Albany, Indiana

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Roofings and Shingles

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Rex Reversible Strip Shingles
Rex Wide Space Shingles
Rex Shingles (8 x 12½ inches)
Rex Slate Surfaced Roofing—32 inch
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Rex Inlaid Roofing (shingle pattern)
Rex Starting Strips—50 foot lengths, 8, 12, 16, 20 inch widths.
Rex Flintkote Roofing—1, 2, 3 ply
Zarex Roofing—1, 2, 3 ply
Mikado Roofing—1, 2, 3 ply
Steadfast Roofing—1, 2, 3 ply
Double Sanded Roofing—3, 4, 5 ply
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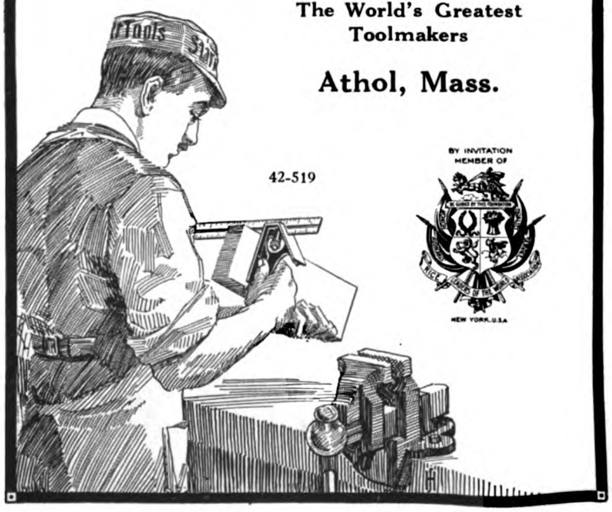

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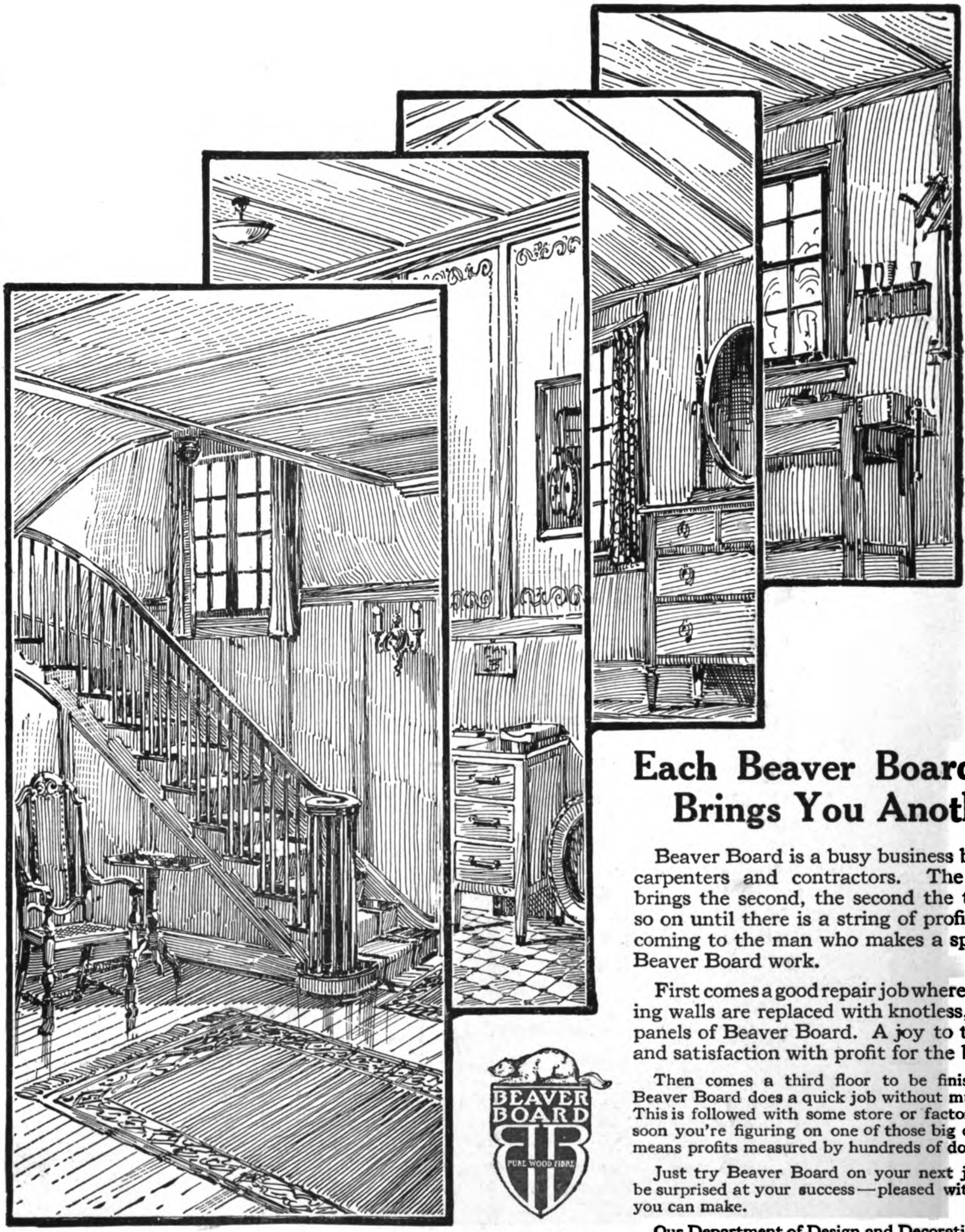

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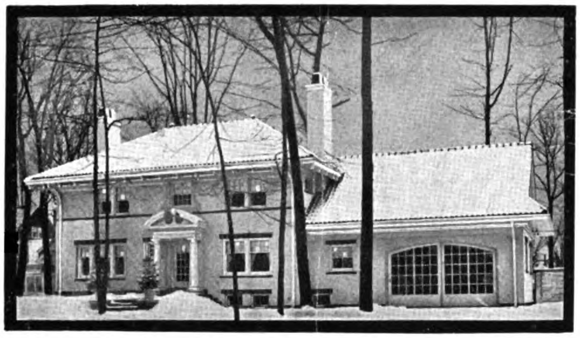
BUILDING AGE

House of Mr. Wm. Smathers, Atlantic City, N. J.   J. Fletcher Street, Architect

A Description of this House will be Found on Pages 549-551 of this Issue



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Send accurate measurements of rooms for sketch with exact estimate of cost of the flooring required. Instructions for laying and finishing accompany all orders shipped.

Send for free catalogue in natural wood colors.

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